



SEPTA Regional Rail Station Shed Analysis:  
West Trenton, Elwyn, Warminster, and Fox Chase Lines

December, 2010





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# Executive Summary

In fiscal year 2010, the Southeastern Pennsylvania Transportation Authority (SEPTA) requested through DVRPC's Unified Planning Work Program (UPWP) a series of station shed studies along the West Trenton, Elwyn, Warminster, and Fox Chase regional rail lines. These studies define the geographic areas from which transit riders originate. This data was collected through license plate surveys conducted in the region. A total of 25 stations were surveyed, including all of the West Trenton regional rail line. These surveys were conducted in two batches: one in the fall on October 14 and 16, 2009, and the other in the spring on April 15 and 22, 2010.

A new method was developed by DVRPC that uses the relative density of the rider origins instead of a distance from the station. This method can be consistently applied from study to study, allowing for comparison of rider origins over time. The analysis seems to indicate that riders tend to drive into the next inbound station and not necessarily to the geographically closest station. There are numerous reasons for this phenomenon, including, but not limited to, change in fare zone, parking availability, frequency of service, and the station's connectivity with the road network allowing for ease of access. These conclusions are of a speculative nature, as the scope of this project was to determine the riders' origin from where they parked, and not to determine the preference for one particular station over another.

The first chapter of this report outlines the method and conduct of the license plate surveys and explains the new method for determining a station shed. There are four following chapters, one each detailing the results of the stations surveyed on the West Trenton, Elwyn, Warminster, and Fox Chase regional rail lines.



# Introduction

## Project Background

In fiscal year 2010, the Southeastern Pennsylvania Transportation Authority (SEPTA) requested through DVRPC's Unified Planning Work Program (UPWP) a series of station shed studies along the West Trenton, Elwyn, Warminster, and Fox Chase regional rail lines. These studies define the geographic areas from which transit riders originate. This data is collected through license plate surveys conducted in the region. Work for this study was conducted at the following stations:

- ▶ Elwyn, Media, Morton, and Clifton stations along the Elwyn line on October 16, 2009
- ▶ West Trenton, Yardley, Forest Hills, Philmont, Meadowbrook, and Noble stations along the West Trenton line on October 14, 2009
- ▶ Woodbourne, Langhorne, Neshaminy Falls, Trevoise, Somerton, Bethayres, and Rydal along the West Trenton line on April 22, 2010
- ▶ Warminster, Hatboro, Willow Grove, and Roslyn along the Warminster line on October 16, 2009
- ▶ Fox Chase, Ryers, Cheltenham, and Olney along the Fox Chase line on April 15, 2010

These stations were surveyed, by license plate, to define the geographic draw of each station by commuter origins. The purpose of this project is to determine origins of commuters who drove to work so as to define the geographic catchment area of each station.

## Data Collection

The data was collected using a one-day sample of license plates of cars parked at the selected stations. Since many stations were being studied, the stations were surveyed in batches—one group in the fall and one in the spring. On the days surveyed, license plates of commuters parking at the stations were collected by DVRPC staff, entered in Excel, and sent to PennDOT to obtain corresponding mailing addresses. Addresses received from PennDOT were then address-matched and mapped. In this process, all personal identifying data was stripped, as per the agreement with PennDOT, in order to preserve privacy.

Once all addresses are matched, the station's shed needed to be calculated. In the past, this analysis consisted of measuring the linear distance of each origin point to the station and then aggregating the distances into ten quantiles, excluding the farthest distances as outliers—outliers usually consist of the top 10 to 20 percent of distances from the station. A line was drawn around the remaining points, and this constituted the station's shed. This method proved to be somewhat imprecise. For example, a shed may be all points that are in the first eight quantiles, or within 80 percent of the distance of the furthest rider origin point. A line was then traced around the points that were the edges of those quantiles. However, a different study may conclude that origin points within 90 percent, or even 100 percent, of the furthest rider origin may define the shed. DVRPC's 2006 PATCO study (publication number TM08018), displayed in Figures 1 and 2, used a 90 percent shed. It

is this lack of a constant standard, or distance, which prompted a new method.

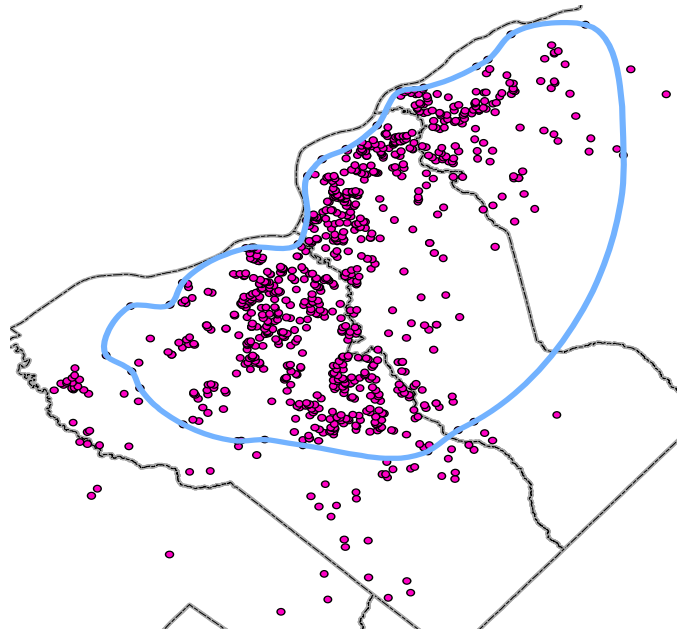
The shed threshold, be it 80 percent, 90 percent, or whatever percent is the best fit, is somewhat imprecise and arbitrary. It is arbitrary in that the shed threshold is determined by natural breaks in the data, which are not consistent between data sets. It is imprecise as it may include empty spaces—with no origin points—and exclude significant clusters of origin points that were beyond the shed threshold and thus deemed outliers. The point of the exercise is to exclude true outliers—points that are random or without explanation.

Figure 1 displays the results of a study conducted at the PATCO Ferry Avenue Station in Camden, New Jersey in 2006. The red dots are mapped rider origins, while the blue line is the 90 percent threshold for the station shed. One can see a large amount of “empty” space included in the eastern portion of the shed, and a few clusters excluded in the southern section along the shed boundary.

A new method developed by DVRPC staff uses the relative density of origins. After being address-matched and mapped, a kernel point density was calculated using ESRI's Spatial Analyst tool. Using a 50-meter grid, a 3,000-meter radius, and calculated in square meters, a density surface is created that represents the densities of origins relative to each other, and not dependent on a linear distance from the station.

Quantiles is a statistical method for displaying data by aggregating the data into bins that each contain an equal number of data points. By splitting a data set into 10 quantiles, for example, each bin has one tenth of the data points, or ten percent of the data.

Figure 1: Old Shed Analysis



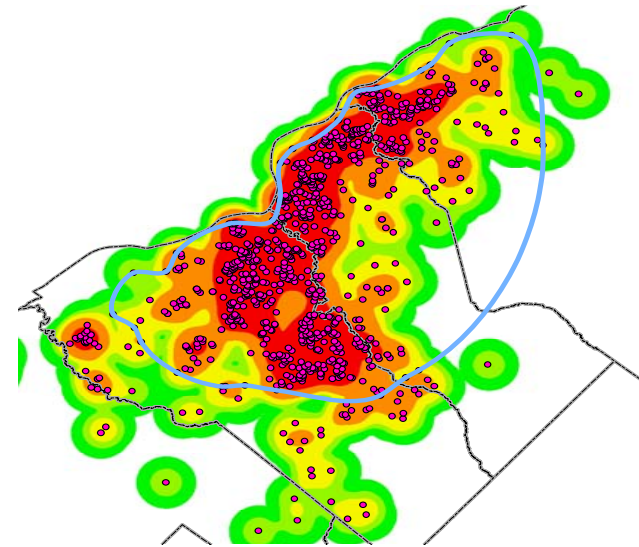
Source: 2006 DVRPC

Figure 2 displays the same points in Figure 1 calculated in the new method. The densities are displayed using five quantiles, with red being the highest densities and dark green being the lowest. In this analysis, red and orange bands represent significant clustering of origins, while the green to yellow represent lower levels of clustering bordering on insignificant. Overlaid on the raster density are the geocoded points (in pink) and the old 90 percent shed (in blue) for comparison. The imprecise nature of the old method becomes evident in Figure 2, as the large cluster of origins to the southwest that were excluded in the old method are now displayed

as significant, and that large area of empty space in the east of the shed is no longer included.

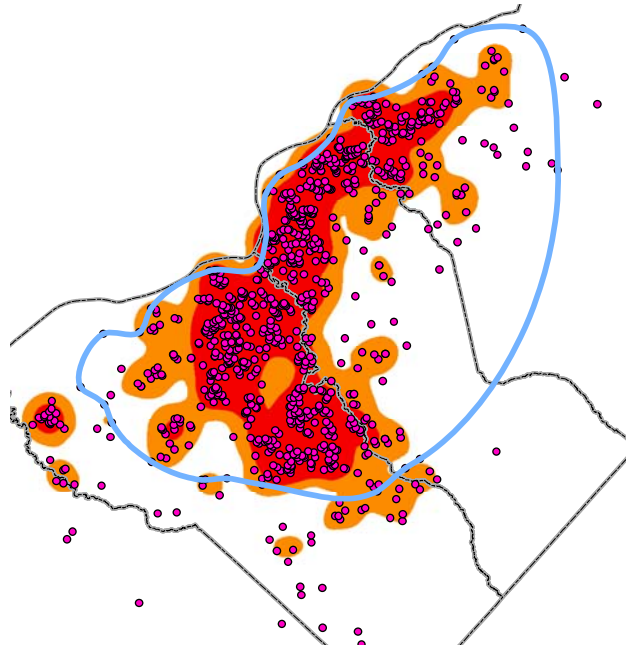
To add to the precision of this new method, all green and yellow bands can be turned off or ignored and only the highest densities displayed. This will help to visually remove any outliers, which would be points that are dispersed and far from the larger cluster of origins, as displayed in Figure 3. A benefit of this analysis is that it is independent of the station surveyed. It relies instead on the proximity of the origins to each other, and not on a linear distance from a station. This allows for a shed of an entire transit line to be calculated, and not just on a station-to-station basis.

Figure 2: New Shed Analysis



Source: 2006 DVRPC

Figure 3: New Shed Analysis Top 2 Quantiles



Source: 2006 DVRPC

## Analysis of the Data

The following chapters summarize data analysis for each of the stations. The distribution of origins is shown by municipality in a tabular form to present a simple breakdown of the distribution of commuters using the station. The top five municipal origins have been tabulated, but there are instances where there are less than five origins and all origins are tabulated, or where there is a tie for the fifth spot and six origins are tabulated. The tabular information permits easy comparisons where historic station shed data has been previously collected.

The distribution of origins is also illustrated graphically with maps, as outlined above. This shows clusters to systematically map station sheds, and also shows the precise distribution of origins within the municipalities and in relation to major roads.

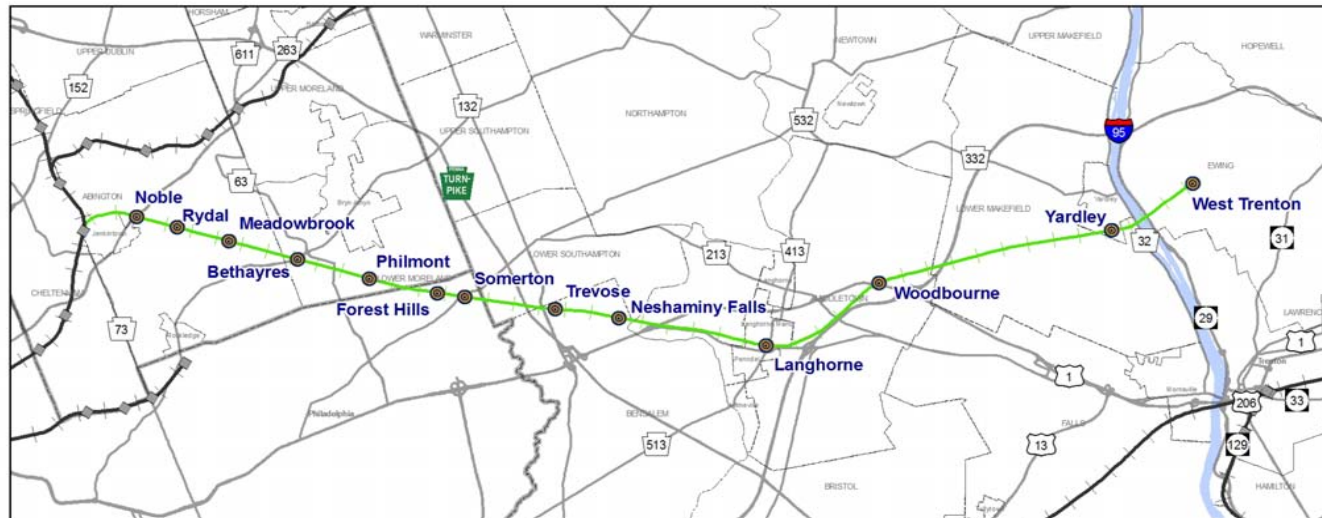
# West Trenton Regional Rail Line

## West Trenton Description

The SEPTA West Trenton Line runs northeast between Central Philadelphia and Ewing, New Jersey. This line runs through Jenkintown-Wyncote and connects to several stations in Montgomery County, Northeast Philadelphia, and Bucks County, as well as one New Jersey station.

The following West Trenton Line stations were surveyed: West Trenton, Yardley, Woodbourne, Langhorne, Neshaminy Falls, Trevose, Somerton, Forest Hills, Philmont, Bethayres, Meadowbrook, Rydal, and Noble. Figure 4 displays the stations surveyed along the West Trenton regional rail line.

Figure 4: West Trenton Line Surveyed Stations



## West Trenton Station

West Trenton Station is the terminus of the northbound SEPTA West Trenton Line, located at 3 Railroad Avenue and Grand Avenue in Ewing, New Jersey, approximately six miles north of Trenton, New Jersey. This is a Zone Six station with no sales office; the on-board one-way fare to Center City Philadelphia is \$9.00.

According to SEPTA, there are a total of 142 total parking spaces at this station, with an average daily availability of zero spaces. There were 264 daily boards in 2009. A total of 146 license plates were surveyed at West Trenton Station on October 14, 2009. The previous license plate survey at this location took place in 2002. On-street Parking is also available along Railroad Avenue.

Table 1 summarizes the top five origins by municipality for West Trenton Station, all New Jersey municipalities: Ewing, Lawrence, Hopewell, Hamilton, and Raritan. Together, these top five municipality origins represent 61 percent of the surveyed plates at this station.

Table 1: West Trenton Top Five Origins

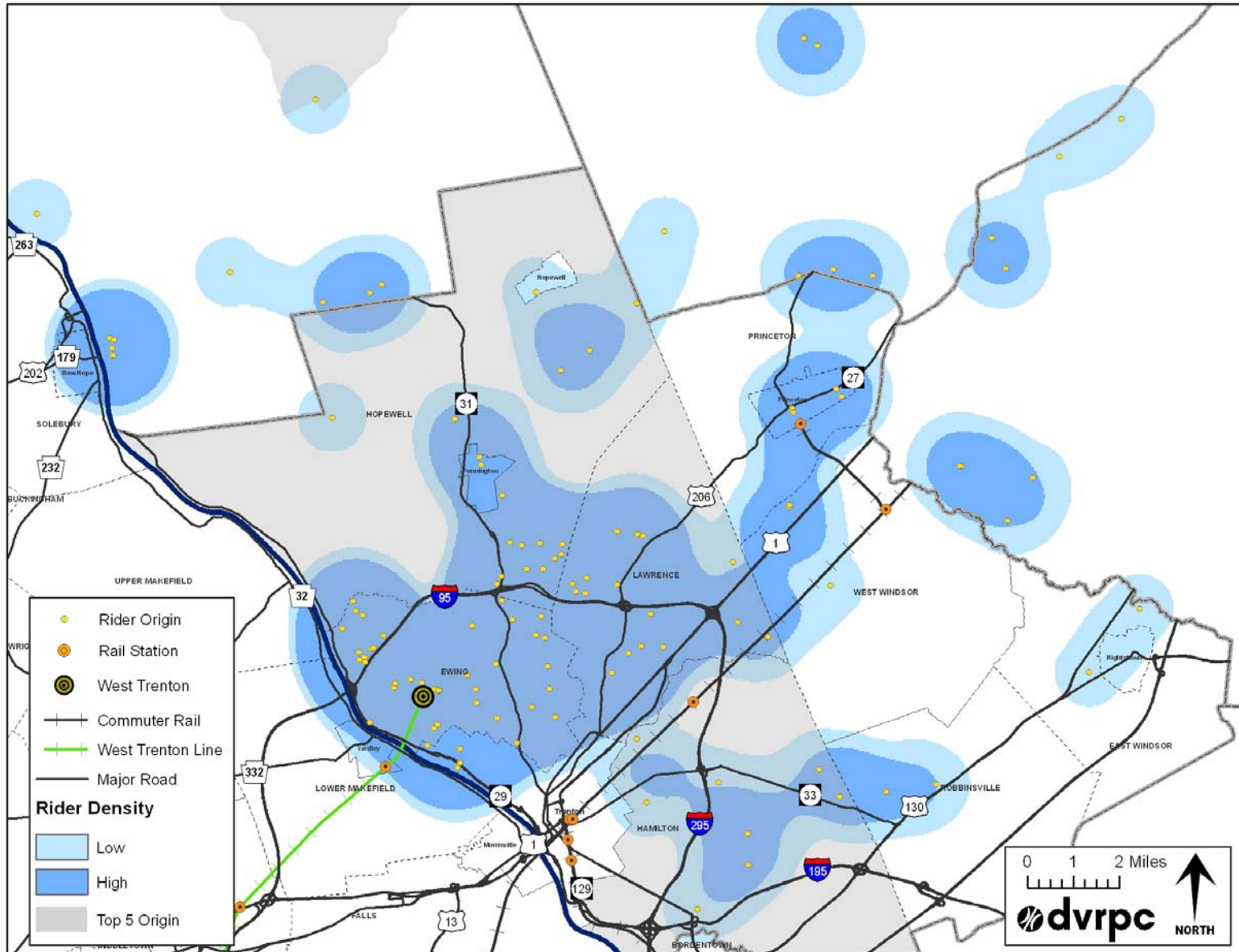
Municipality	Total	Percent
Ewing	40	27%
Lawrence	17	12%
Hopewell	17	12%
Hamilton	8	5%
Raritan	7	5%
Top 5 Total	89	61%
West Trenton Grand Total	146	100%

Source: 2010 DVRPC

Figure 5 illustrates the distribution of origins derived from the license plate survey. All origins are in New Jersey, with the majority clustered around Ewing Township and Interstate 95 corridor. Groups of clusters branch out along the corridors of NJ 27, NJ 29, NJ 32, NJ 33, and US 1 and US 206. Outlying clusters are located in Hamilton, West Amwell, Lambertville, Hopewell, and South Brunswick. These are likely the locations of concentrated residential development, and West Trenton Station is the closest commuter rail with access to Pennsylvania employment centers (NJ Transit commuter rail is also accessible from Trenton, and likely shares much of the West Trenton Station shed area for access to New Jersey employment centers).



Figure 5: West Trenton Station



## Yardley Station

Yardley Station is the last Pennsylvania station on the northbound SEPTA West Trenton Line, located at 7 Reading Avenue and South Main Street in Yardley, Pennsylvania, less than one mile west of the Delaware River. This is a Zone Five station with no sales office; the on-board peak one-way fare to Center City Philadelphia is \$7.00.

According to SEPTA, there are a total of 275 total parking spaces at this station, with an average daily availability of 18 spaces. There were 405 daily boards in 2009. A total of 206 license plates were surveyed at Yardley Station on October 14, 2009. No previous license plate survey has been conducted at this location.

Table 2 summarizes the top five origins by municipality for Yardley Station, all Pennsylvania municipalities: Lower Makefield, Upper Makefield, Falls, Yardley, and Morrisville. Together, these top five municipality origins represent 80 percent of the surveyed plates at this station.

Table 2: Yardley Top Five Origins

Municipality	Total	Percent
Lower Makefield	108	52%
Upper Makefield	23	11%
Falls	14	7%
Yardley	11	5%
Morrisville	9	4%
Top Five Total	165	80%
Yardley Grand Total	206	100%

Source: 2010 DVRPC

Figure 6 illustrates the distribution of origins derived from the license plate survey. Most origins are in Pennsylvania, with the majority from Lower Makefield Township. The main cluster is concentrated along the Pennsylvania side of the Delaware River, along the corridors formed by Interstate 95 and PA 32, PA 332, and PA 532. The most significant outlying cluster is located in New Hope, Pennsylvania. Several very small clusters are located in New Jersey municipalities, including Hamilton, Princeton, and Hopewell Twp.



## Woodbourne Station

Woodbourne Station is located at 903 Woodbourne Road in Middletown Township, Bucks County, Pennsylvania, approximately six miles southwest of Yardley Station. This is a Zone 5 station with no sales office; the on-board peak one-way fare to Center City Philadelphia is \$7.00.

According to SEPTA, there are a total of 558 parking spaces at this station. There were 514 daily boards in 2009. A total of 362 license plates were surveyed at West Trenton Station on April 22, 2010. The previous license plate survey at this location took place in 2003.

Table 3 summarizes the top five origins by municipality for Woodbourne Station: Middletown, Newtown, Lower Makefield, Northampton, and Falls. Together, these top five municipality origins represent 90 percent of the surveyed plates at this station.

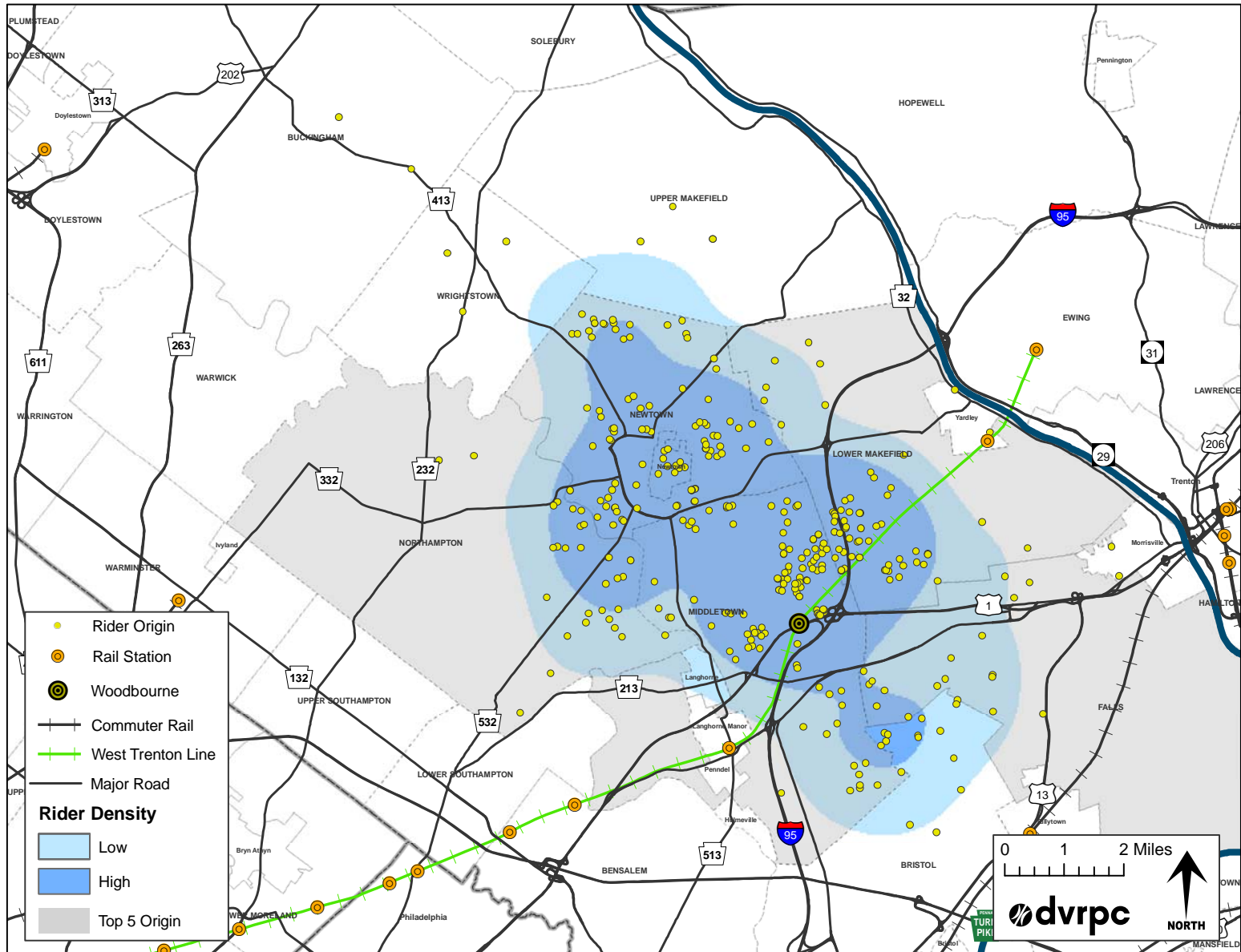
Table 3: Woodbourne Top Five Origins

Municipality	Total	Percent
Middletown	116	32%
Newtown	98	27%
Lower Makefield	62	17%
Northampton	32	9%
Falls	16	4%
Top Five Total	324	90%
Woodbourne Grand Total	362	100%

Source: 2010 DVRPC

Figure 7 illustrates the distribution of origins derived from the license plate survey. Most origins are within the same cluster, focused along PA 413 and along Interstate 95, and are approximately bordered by US 1 at the south.

Figure 7: Woodbourne Station



## Langhorne Station

Langhorne Station is located at 8 Bellevue Avenue and Comly Avenue in Langhorne Manor, Pennsylvania, approximately three miles southwest of Woodbourne Station. This is a Zone 4 station with a sales office that is open Monday through Friday mornings; the on-board peak one-way fare to Center City is \$7.00.

According to SEPTA, there are a total of 236 daily parking spaces at this station, with an average daily availability of 28 spaces, and 123 permit parking spaces. There were 676 daily boards in 2009. A total of 280 license plates were surveyed at Langhorne Station on April 22, 2010. The previous license plate survey at this location took place in 2005.

Table 4 summarizes the top five origins by municipality for Langhorne Station: Middletown, Newton Township, Northampton, Bristol Township, and Bensalem. Together, these top five municipality origins represent 83 percent of the surveyed plates at this station.

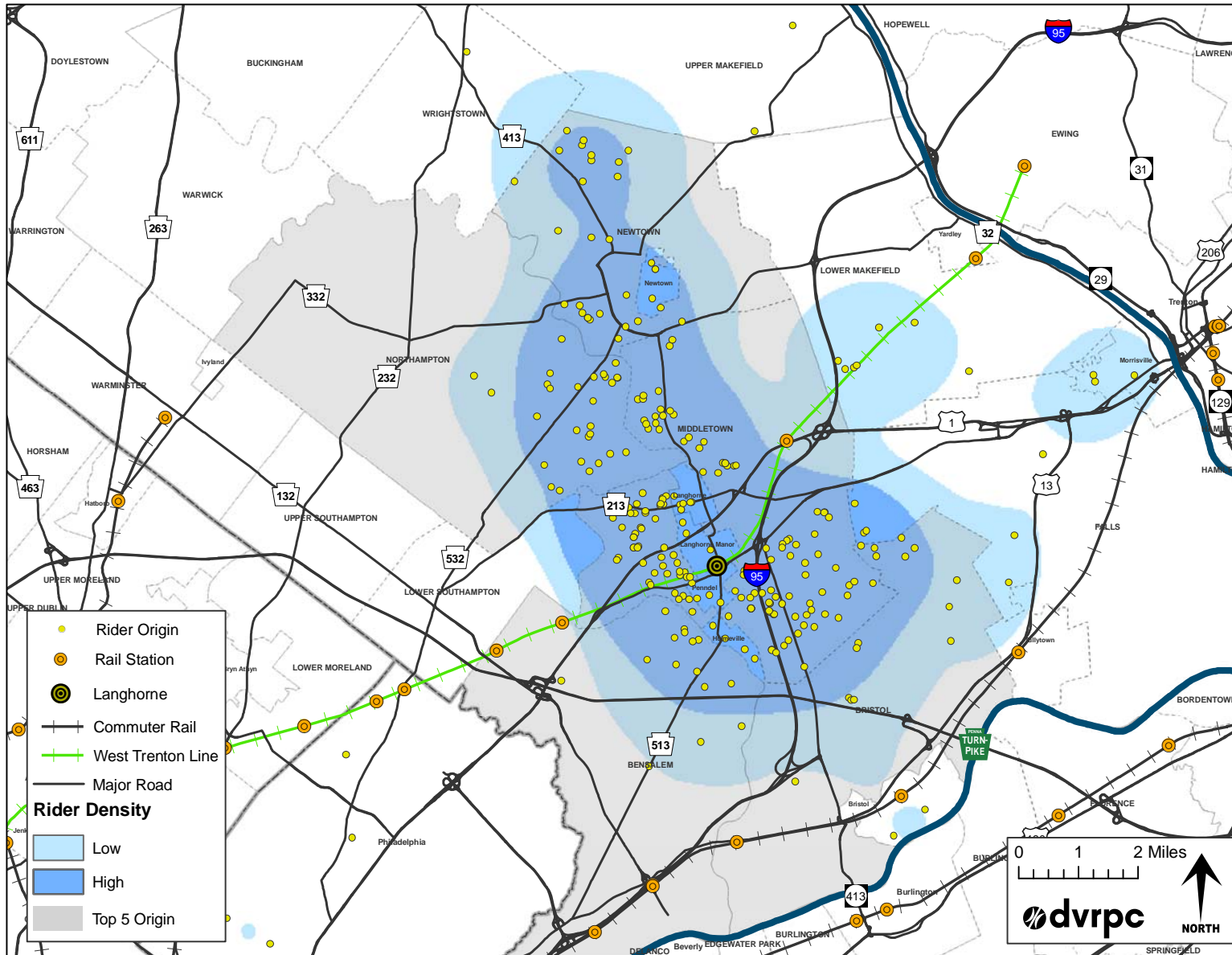
Table 4: Langhorne Top Five Origins

Municipality	Total	Percent
Middletown	140	50%
Newtown	31	11%
Northampton	28	10%
Bristol Township	17	6%
Bensalem	15	5%
Top Five Total	231	83%
Langhorne Total	280	100%

Source: 2010 DVRPC

Figure 8 illustrates the distribution of origins derived from the license plate survey. Most origins are within the same cluster, focused around PA 413. The cluster is concentrated within the corridor between PA 532 and US 13.

Figure 8: Langhorne Station



## Neshaminy Falls Station

Neshaminy Falls Station is located at 4254 E. Bristol Road and Grove Avenue in Bensalem, Pennsylvania, approximately four miles southwest of Langhorne Station. This is a Zone 4 station with no sales office; the on-board peak one-way fare to Center City is \$7.00.

According to SEPTA, there are a total of 187 daily parking spaces at this station, with an average daily availability of zero spaces. There were 274 daily boards in 2009. A total of 165 license plates were surveyed at Neshaminy Falls Station on April 22, 2010. The previous license plate survey at this location took place in 2005.

Table 5 summarizes the top five origins by municipality for Neshaminy Falls Station: Bensalem, Northampton, Lower Southampton, Middletown, and Newtown Township. Together, these top five municipality origins represent 93 percent of the surveyed plates at this station.

Table 5: Neshaminy Falls Top Five Origins

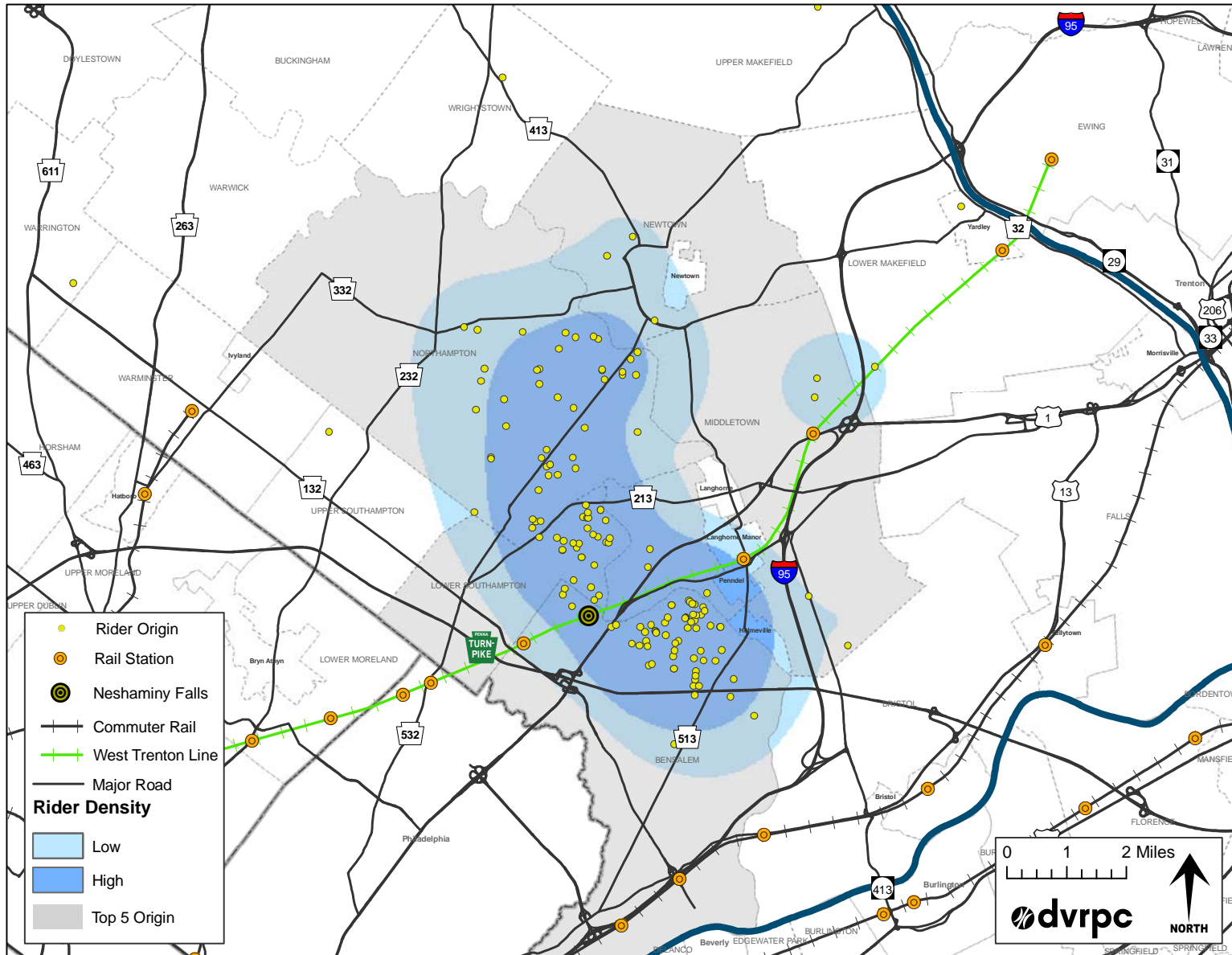
Municipality	Total	Percent
Bensalem	70	42%
Northampton	45	27%
Lower Southampton	29	17%
Middletown	7	4%
Newtown	3	2%
Top Five Total	154	93%
Neshaminy Falls Total	165	100.0%

Source: 2010 DVRPC

Figure 9 illustrates the distribution of origins derived from the license plate surveys. The elongated cluster is approximately bordered by PA 332 at the north, PA 413 at the east, PA Turnpike at the south, and PA 132 at the west.



Figure 9: Neshaminy Falls Station



## Trevoze Station

Trevoze Station is located at 1083 Boundbrook Avenue and Ridge Avenue in Bensalem, Pennsylvania, less than two miles southwest of Neshaminy Falls Station. This is a Zone 4 station with no sales office; the on-board peak one-way fare to Center City is \$7.00.

According to SEPTA, there are a total of 219 daily parking spaces at this station, with an average daily availability of 38 spaces. There were 275 daily boards in 2009. A total of 166 license plates were surveyed at Trevoze Station on April 22, 2010. The previous license plate survey at this location took place in 2005.

Table 6 summarizes the top five origins by municipality for Trevoze Station: Lower Southampton, Northampton, Bensalem, Upper Southampton, and Middletown. Together, these top five municipality origins represent 95 percent of the surveyed plates at this station.

Table 6: Trevoze Top Five Origins

Municipality	Total	Percent
Lower Southampton	82	49%
Northampton	50	30%
Bensalem	16	10%
Upper Southampton	7	4%
Middletown	3	2%
Top Five Total	158	95%
Trevoze Total	166	100%

Source: 2010 DVRPC

Figure 10 illustrates the distribution of origins derived from the license plate surveys. Many of the origins are located very close to Trevoze Station, in a triangle bounded by PA 132 and PA 213 and US 1. Beyond that primary cluster, the large majority of origins are located north of the West Trenton Line, bounded at the southwest by PA 532, at the northwest and north by PA 232 and PA 332, at the east by PA 413, and at the southeast by US 1.



## Somerton Station

Somerton Station is located at 13603 Philmont Avenue and Bustleton Avenue in Philadelphia, Pennsylvania, just under two miles southwest of Trevoose Station. This is a Zone 3 station with a sales office that is open Monday through Friday mornings; the on-board peak one-way fare to Center City is \$6.00.

According to SEPTA, there are a total of 201 daily parking spaces at this station, with an average daily availability of zero spaces. There were 867 daily boards in 2009. A total of 198 license plates were surveyed at Somerton Station on April 22, 2010. The previous license plate survey at this location took place in 2005.

Table 7 summarizes the top five origins by municipality for Somerton Station: Northampton, Lower Southampton, Philadelphia, Upper Southampton, and Newtown Township. Together, these top five municipality origins represent 94 percent of the surveyed plates at this station.

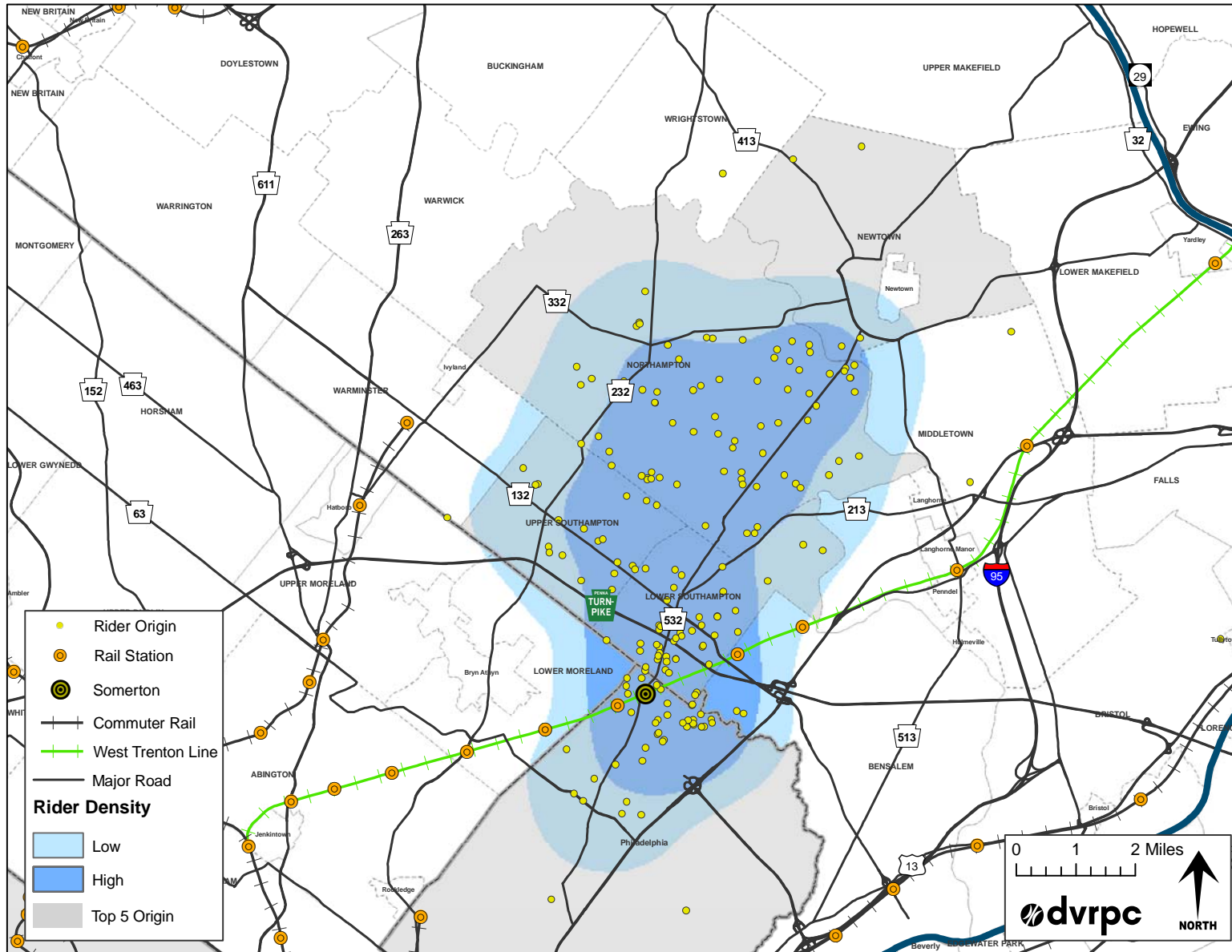
Table 7: Somerton Top Five Origins

Municipality	Total	Percent
Northampton	73	37%
Lower Southampton	45	23%
Philadelphia	45	23%
Upper Southampton	20	10%
Newtown	4	2%
Top Five Total	187	94%
Somerton Total	198	100%

Source: 2010 DVRPC

Figure 11 illustrates the distribution of origins derived from the license plate surveys. The cluster extends to both north and south of the station, with a significant number of origins located in the quadrant of upper northeast Philadelphia bounded by PA 63 and Roosevelt Boulevard. Outside of Philadelphia, the cluster of origins extends north, bounded at the northwest by PA 232, at the north by PA 332, and at the northeast by PA 413.

Figure 11: Somerton Station



## Forest Hills Station

Forest Hills Station is located at 303 Byberry Road near Philmont Avenue in Philadelphia, Pennsylvania, less than one mile southwest of Somerton Station. This is a Zone 3 station with no sales office; the on-board peak one-way fare to Center City is \$6.00.

According to SEPTA, there are a total of 155 daily parking spaces at this station, with an average daily availability of nine spaces. There were 420 daily boards in 2009. A total of 205 license plates were surveyed at Forest Hills Station on October 14, 2009. No previous license plate survey has been conducted at this location. There is a significant amount of riders parking for the station along Byberry Road.

Table 8 summarizes the top five origins by municipality for Forest Hills Station: Philadelphia, Lower Moreland, Northampton, Upper Southampton, and Lower Southampton. Together, these top five municipality origins represent 86 percent of the surveyed plates at this station.

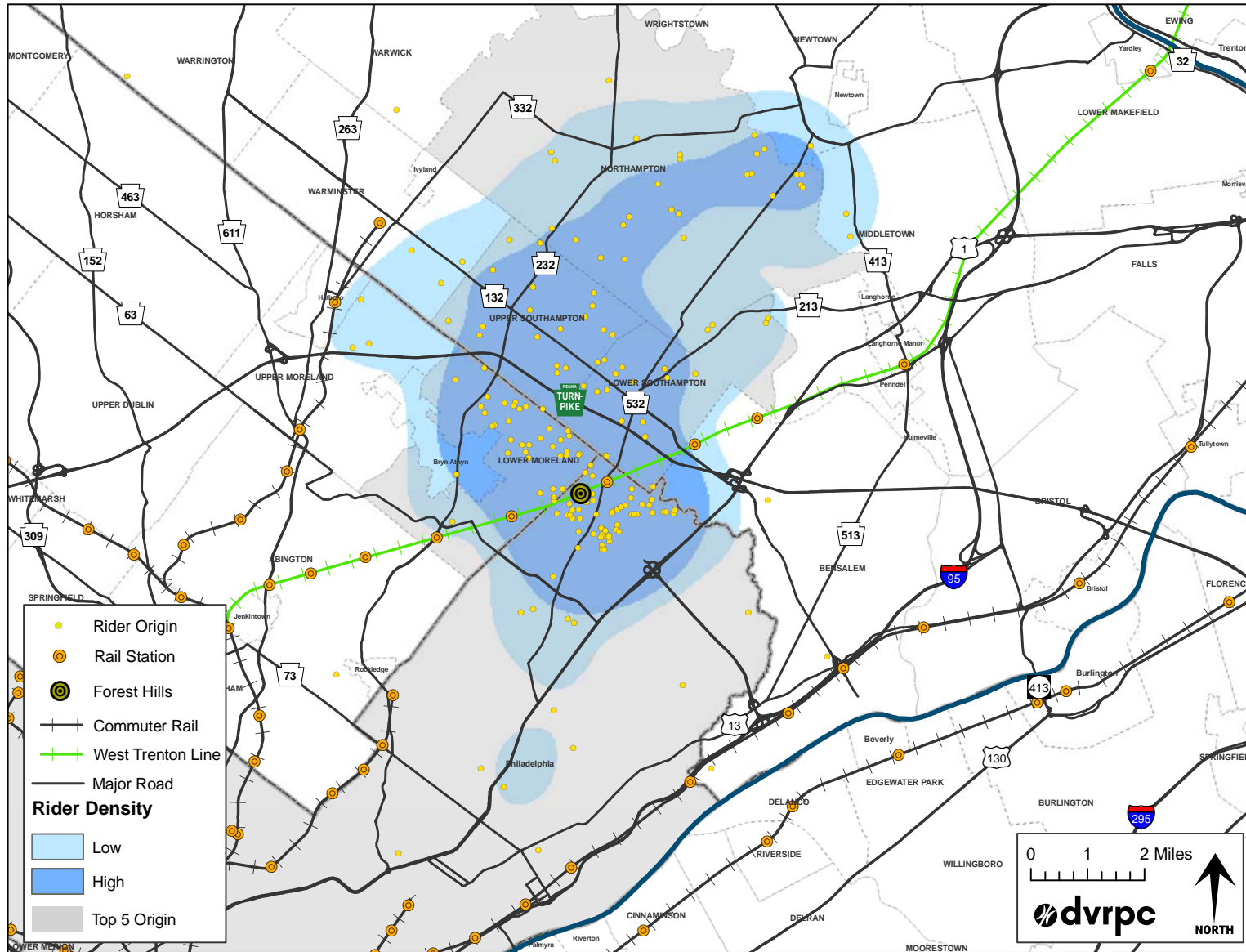
Table 8: Forest Hills Top Five Origins

Municipality	Total	Percent
Philadelphia	71	35%
Lower Moreland	36	18%
Northampton	30	15%
Upper Southampton	21	10%
Lower Southampton	19	9%
Top Five Total	177	86%
Forest Hills Total	205	100%

Source: 2010 DVRPC

Figure 12 illustrates the distribution of origins derived from the license plate surveys. Most origins are within the same cluster, approximately bordered by PA 63 at the southwest, US 1 at the southeast, PA 332 at the northwest, and PA 413 at the northeast. Some origins are located very close to the nearby Warminster Line, west of the West Trenton Line.

Figure 12: Forest Hills Station



## Philmont Station

Philmont Station is located at 106 Tomlinson Road and Philmont Avenue in Lower Moreland, Pennsylvania, just over one mile west of Forest Hills Station. This is a Zone 3 station with a sales office that is open Monday through Friday mornings; the on-board peak one-way fare to Center City is \$6.00.

According to SEPTA, there are a total of 249 daily parking spaces at this station, with an average daily availability of zero spaces, and 164 permit parking spaces. There were 653 daily boards in 2009. A total of 384 license plates were surveyed at Philmont Station on October 14, 2009. No previous license plate survey has been conducted at this location.

Table 9 summarizes the top four origins by municipality for Philmont Station: Philadelphia, Lower Moreland, Northampton, and Upper Southampton. Together, these top four municipality origins represent 91 percent of the surveyed plates at this station. Four cars came from each of the next most common origins, Warwick and Warminster. Together, the top four plus the next two most common origins represent 93 percent of the surveyed plates at this station.

Table 9: Philmont Top Four Origins

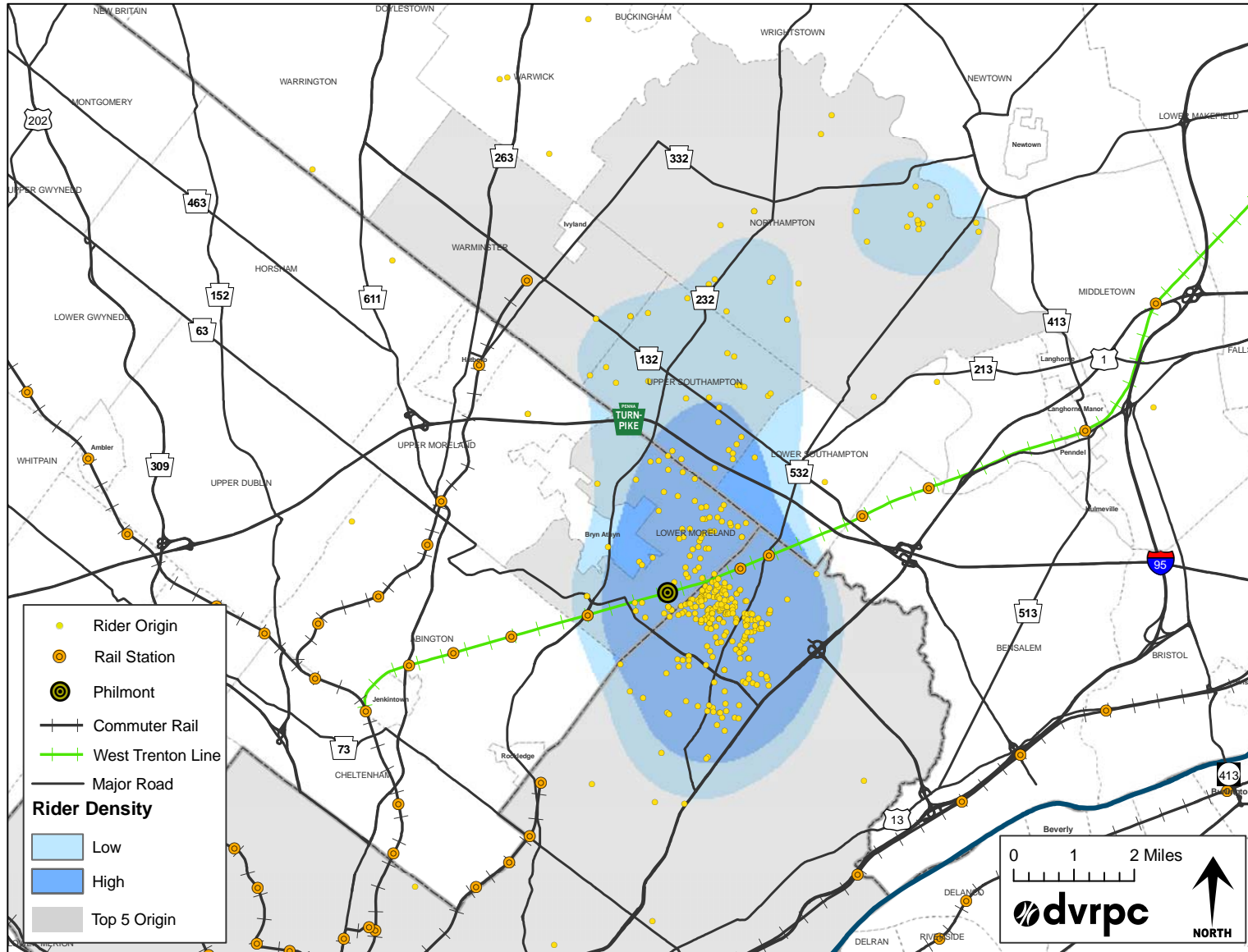
Municipality	Total	Percent
Philadelphia	229	60%
Lower Moreland	66	17%
Northampton	28	7%
Upper Southampton	25	7%
Top Four Total	348	91%
Philmont Total	384	100%

Source: 2010 DVRPC

Figure 13 illustrates the distribution of origins derived from the license plate surveys. Most origins are within the same distinct cluster, and many of these are located within the area bounded by US 1 at the southeast, PA Turnpike at the northeast, and PA 232 and PA 63 at the northwest and southwest.



Figure 13: Philmont Station



## Bethayres

Bethayres Station is located at 598 Station Road and Welsh Road in Lower Moreland, Pennsylvania, approximately two miles west of Philmont Station. This is a Zone 3 station with a sales office that is open Monday through Friday mornings; the on-board peak one-way fare to Center City is \$6.00.

According to SEPTA, there are a total of 330 daily parking spaces at this station, with an average daily availability of zero spaces, and 93 permit parking spaces. There were 636 daily boards in 2009. A total of 404 license plates were surveyed at Bethayres Station on April 22, 2010. The previous license plate survey at this location took place in 2005.

Table 10 summarizes the top five origins by municipality for Bethayres Station: Philadelphia, Lower Moreland, Abington, Upper Southampton, and Upper Moreland. Together, these top five municipality origins represent 79 percent of the surveyed plates at this station.

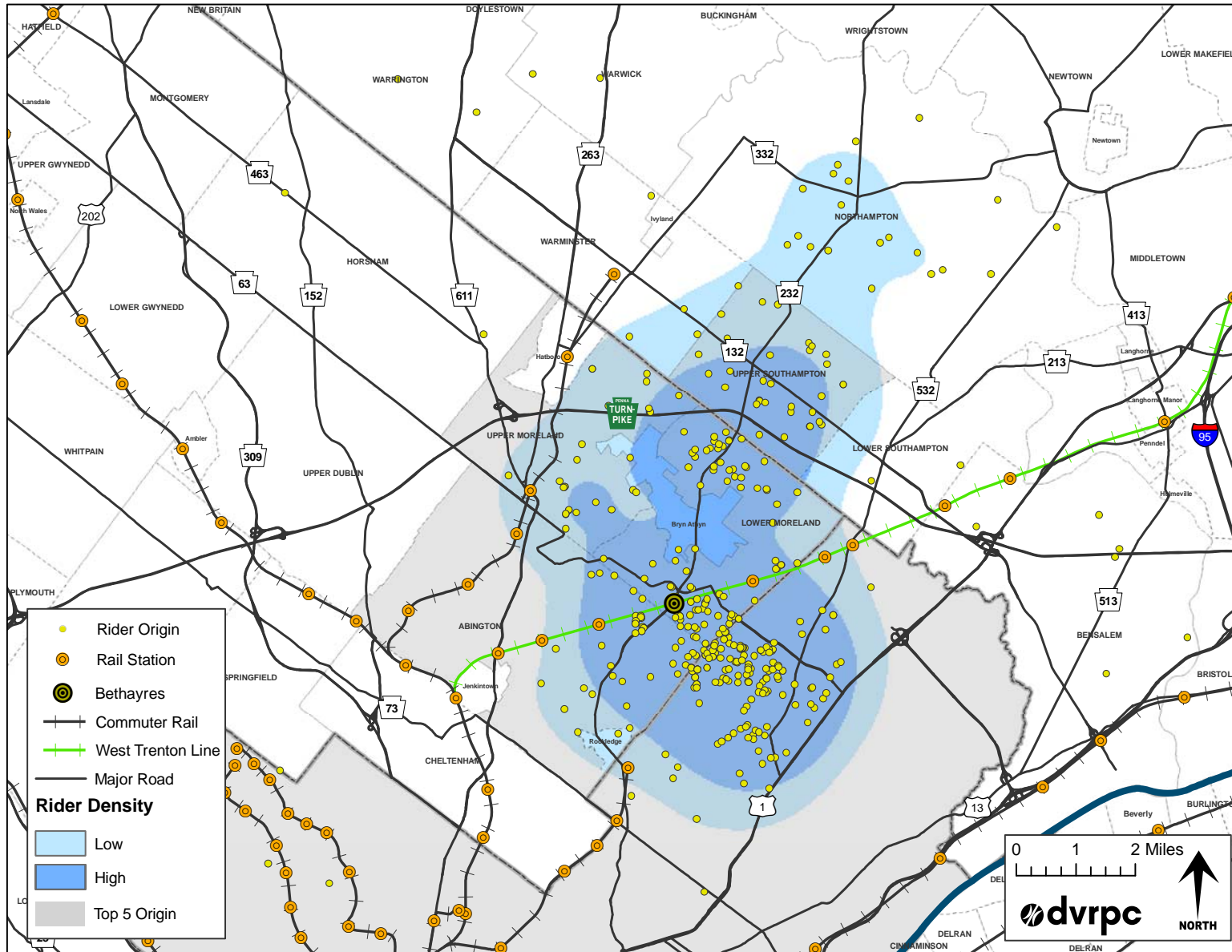
Table 10: Bethayres Top Five Origins

Municipality	Total	Percent
Philadelphia	160	40%
Lower Moreland	85	21%
Abington	44	11%
Upper Southampton	32	8%
Upper Moreland	29	7%
Top Five Total	321	79%
Bethayers Total	404	100%

Source: 2010 DVRPC

Figure 14 illustrates the distribution of origins derived from the license plate surveys. Nearly all of the origins are within a cluster bounded at the southwest by PA 73, at the northwest by PA 611, at the northeast by PA 132, and at the southeast by PA 532. Many of the southernmost origins are located in close proximity to the Fox Chase Line, and many of the origins in the northwest quadrant of the main cluster are located in close proximity to the Warminster Line.

Figure 14: Bethayres Station



## Meadowbrook Station

Meadowbrook Station is located at 1663 Old Valley Road and Mill Road in Abington, Pennsylvania, approximately two miles southwest of Bethayres Station. This is a Zone 3 station with no sales office; the on-board peak one-way fare to Center City is \$6.00.

According to SEPTA, there are a total of 90 daily parking spaces at this station, with an average daily availability of 10 spaces. There were 130 daily boards in 2009. A total of 80 license plates were surveyed at Meadowbrook Station on October 14, 2009. No previous license plate survey has been conducted at this location.

Table 11 summarizes the top five origins by municipality for Meadowbrook Station: Abington, Lower Moreland, Philadelphia, Upper Moreland, and Upper Southampton. Together, these top five municipality origins represent 90 percent of the surveyed plates at this station.

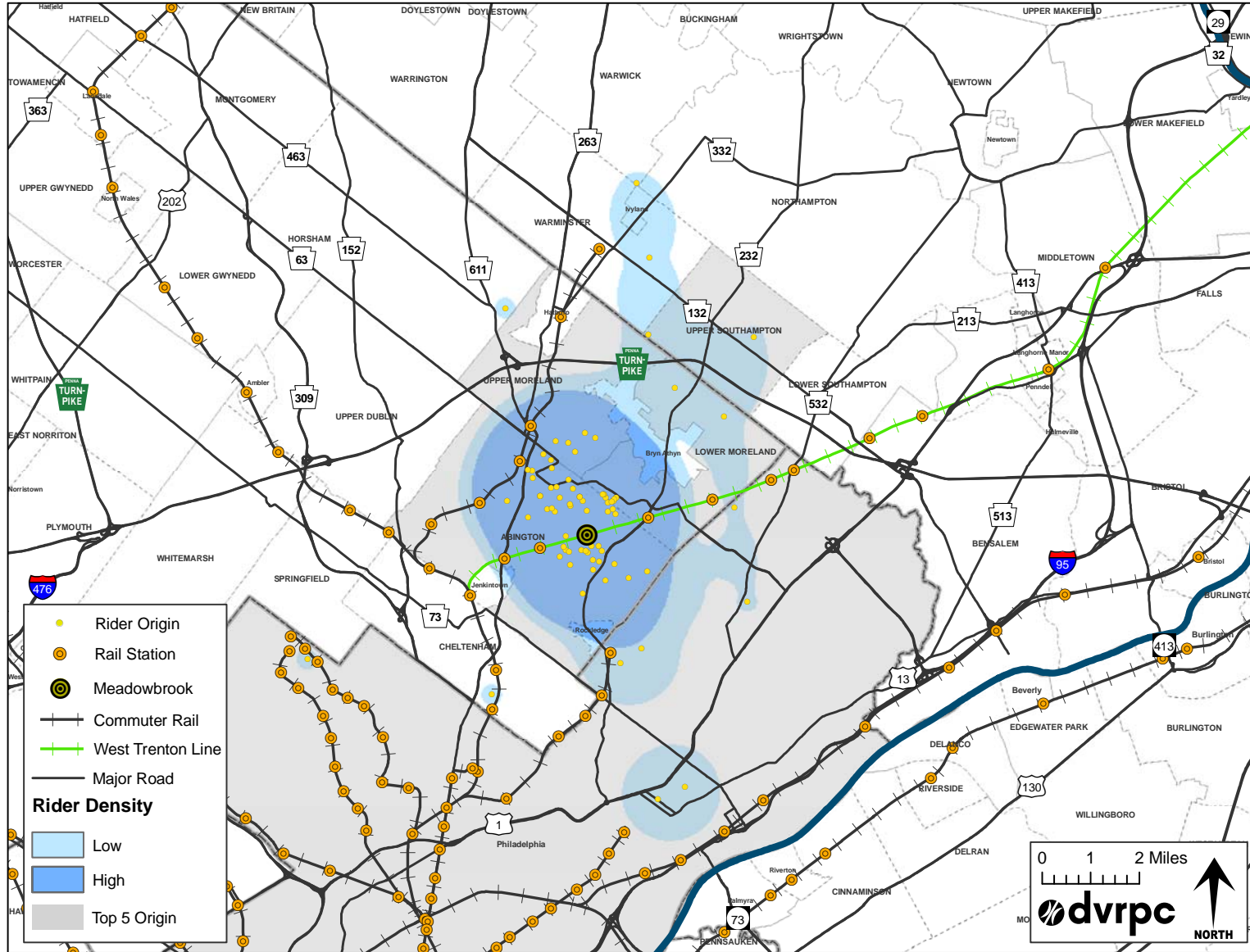
Table 11: Meadowbrook Top Five Origins

Municipality	Total	Percent
Abington	48	60%
Lower Moreland	11	14%
Philadelphia	8	10%
Upper Moreland	5	6%
Upper Southampton	2	3%
Top Five Total	72	90%
Meadowbrook Total	80	100%

Source: 2010 DVRPC

Figure 15 illustrates the distribution of origins derived from the license plate surveys. Most origins are within the same distinct cluster, and most of these origins are concentrated in a smaller area bounded by PA 611, PA 63, and PA 232. Many of these origins are also located as geographically close to other SEPTA train stations along the West Trenton and Warminster lines as to Meadowbrook Station.

Figure 15: Meadowbrook Station



## Rydal Station

Rydal Station is located at 1096 Washington Lane and Susquehanna Road in Abington, Pennsylvania, just over one mile west of Meadowbrook Station. This is a Zone 3 station with no sales office; the on-board peak one-way fare to Center City is \$6.00.

According to SEPTA, there are a total of 43 daily parking spaces at this station, with an average daily availability of seven spaces. There were 107 daily boards in 2009. A total of 34 license plates were surveyed at Rydal Station on April 22, 2010. The previous license plate survey at this location took place in 2006.

Table 12 summarizes the top two origins by municipality for Rydal Station: Abington and Philadelphia. Together, these top two municipality origins represent 88 percent of the surveyed plates at this station. One car came from each of the other four origins: Cheltenham, Upper Southampton, Northampton, and Muncy. Together, these six municipalities represent all of the 34 surveyed plates at this station.

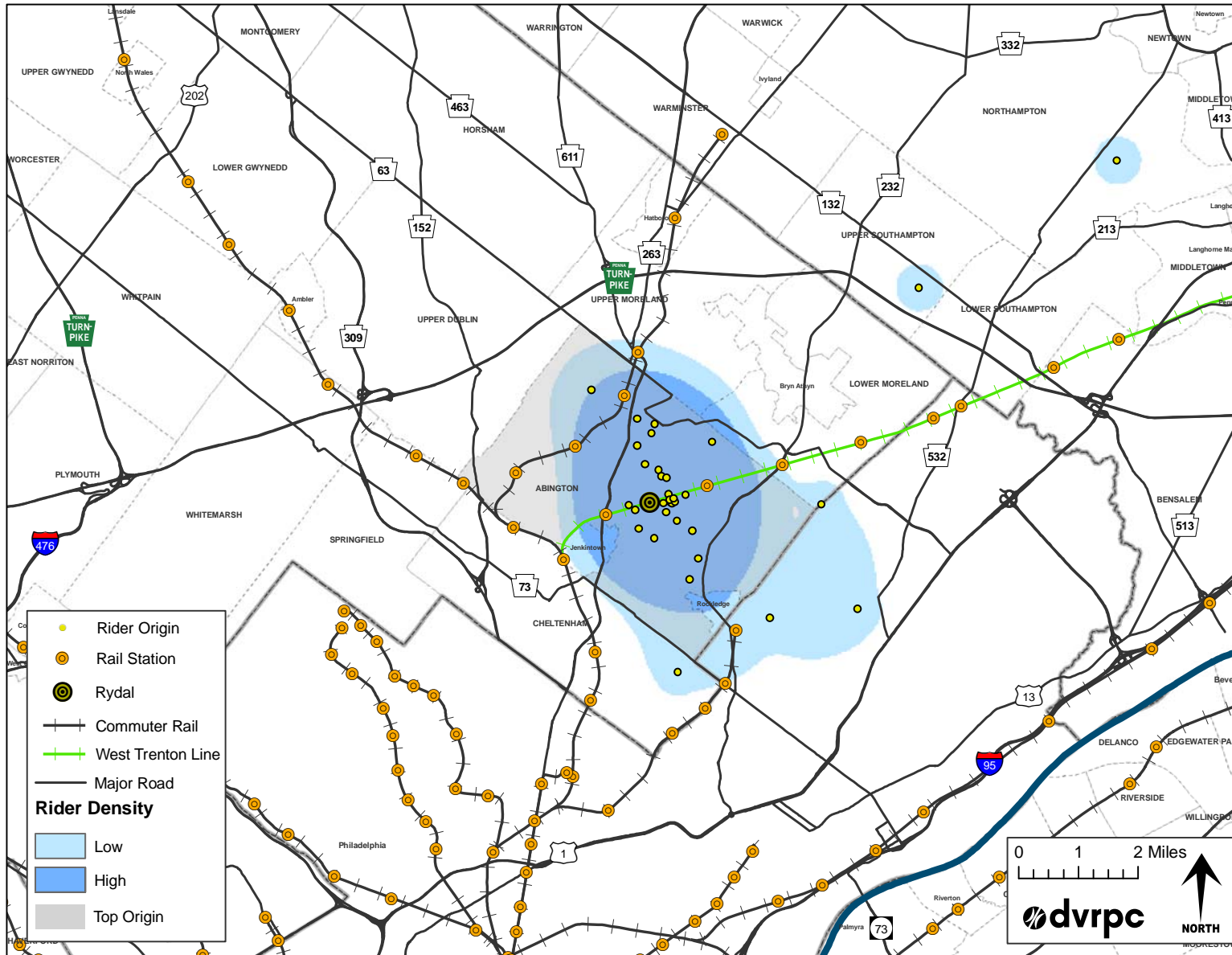
Table 12: Rydal Top Two Origins

Municipality	Total	Percent
Abington	27	79%
Philadelphia	3	9%
Top Two Total	30	88%
Rydal Total	34	100%

Source: 2010 DVRPC

Figure 16 illustrates the distribution of origins derived from the license plate surveys. Most of the origins are located with close proximity to Rydal Station and form a distinct cluster that is bounded by PA 611, PA 63, PA 232, and PA 73. Several of the outlying origins are located in close proximity to the Fox Chase and Warminster lines.

Figure 16: Rydal Station



## Noble Station

Noble Station is located at 762 Rodman Avenue and Old York Road (Route 611) in Abington, Pennsylvania, just under one mile west of Rydal Station. This is a Zone 3 station with no sales office; the on-board peak one-way fare to Center City is \$6.00.

According to SEPTA, there are a total of 43 daily parking spaces at this station, with an average daily availability of seven spaces. There were 232 daily boards in 2009. A total of 141 license plates were surveyed at Noble Station on October 14, 2009. The previous license plate survey at this location took place in 2000.

This license plate survey was conducted in a SEPTA parking lot that merged with a shopping center and office building parking lot. There were no clear boundaries between these parking lots, and survey results may include non-SEPTA users. For example, origins in Blue Bell, which is closer to the SEPTA Lansdale/Doylestown Line, may not be part of the Noble Station shed.

Table 13 summarizes the top three origins by municipality for Noble Station: Abington, Philadelphia, and Upper Moreland. Together, these top three municipality origins represent 61 percent of the surveyed

plates at this station. Four cars came from each of the next four origins: Horsham, Springfield, Upper Dublin, and Jenkintown. Together, these seven municipalities represent 72 percent of the surveyed plates at this station.

Table 13: Noble Top Three Origins

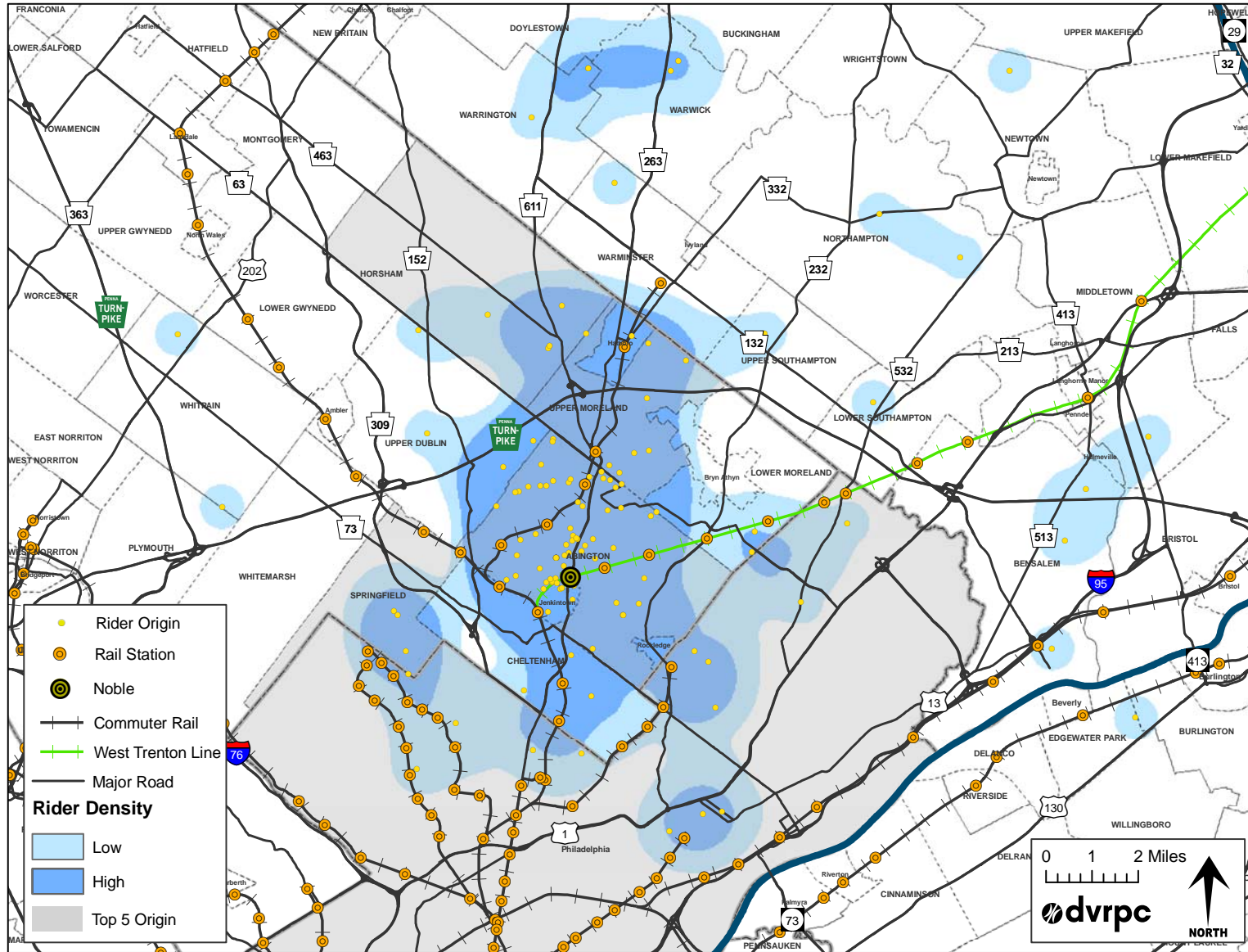
Municipality	Total	Percent
Abington	64	45%
Philadelphia	14	10%
Upper Moreland	8	6%
Top Three Total	86	61%
Noble Total	141	100%

Source: 2010 DVRPC

Figure 17 illustrates the distribution of origins derived from the license plate surveys. Origins for the Noble Station are scattered among several distinct clusters. Most origins are within a close radius to Noble Station, or branch out to the north and south close to the PA 611 corridor. Other significant clusters of origins are located as far north as Warrington, as far east as Bensalem, and to the southwest in Philadelphia and Glenside.



Figure 17: Noble Station





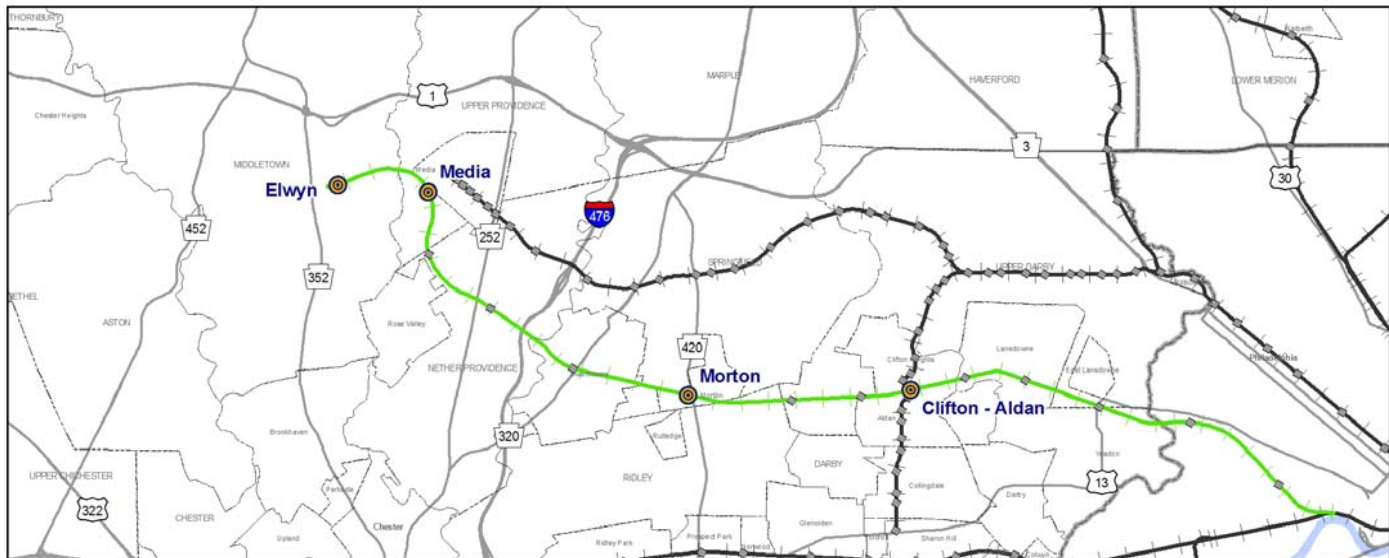
# Elwyn Regional Rail Line

## Elwyn Line Description

The SEPTA Elwyn Regional Rail Line runs southwest between Central Philadelphia and Media, Pennsylvania. This line runs through Southwest Philadelphia and connects to several stations in Delaware County.

The following Elwyn Line stations were surveyed: Elwyn, Media, Morton, and Clifton. Figure 18 displays the stations surveyed along the Elwyn regional rail line.

Figure 18: Elwyn Line Stations Surveyed



## Elwyn Station

Elwyn Station is the terminus of the southbound SEPTA Elwyn Line, and is located at 35 Elwyn Avenue and Middletown Road (Route 352) in Middletown Township, Delaware County, Pennsylvania, approximately one and a half miles southwest of downtown Media. This is a Zone 3 station with no sales office; the on-board peak one-way fare to Center City is \$6.00.

According to SEPTA, there are a total of 233 daily parking spaces at this station, with an average daily availability of zero spaces. There were 504 daily boards in 2009. A total of 341 license plates were surveyed at Elwyn Station on October 16, 2009. The previous license plate survey at this location took place in 2002. Many riders also park along Elwyn Road.

Table 14 summarizes the top five origins by municipality for Elwyn Station: Middletown, Aston, Concord, Westtown, and Thornbury, Delaware County. Together, these top five municipality origins represent 63 percent of the surveyed plates at this station.

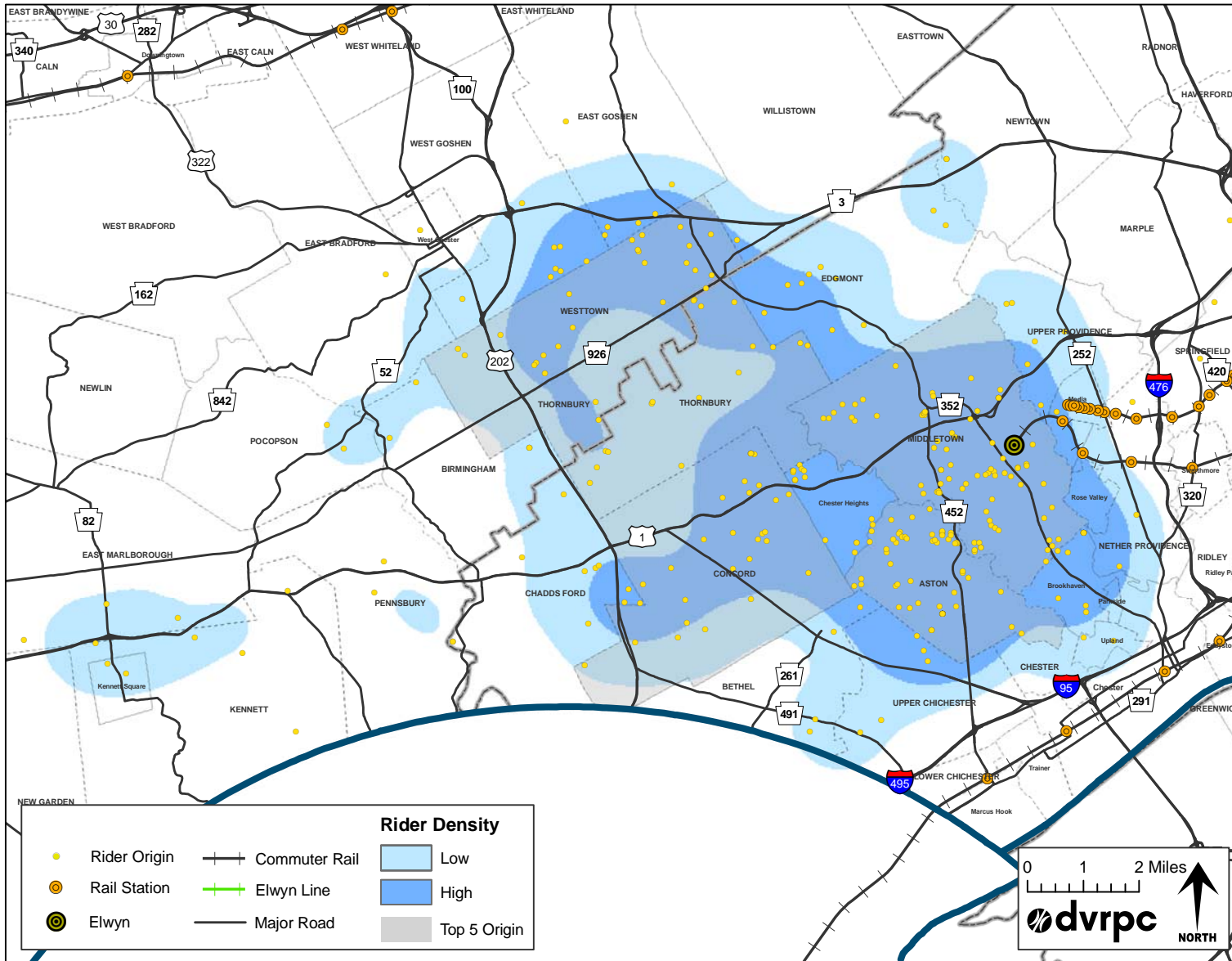
Table 14: Elwyn Top Five Origins

Municipality	Total	Percent
Middletown	80	24%
Aston	58	17%
Concord	29	9%
Westtown	22	7%
Thornbury	20	6%
Top Five Total	209	63%
Elwyn Total	334	100%

Source: 2010 DVRPC

Figure 19 illustrates the distribution of origins derived from the license plate surveys. This station has a very broad station shed, with top origin clusters located up to 13 miles away in West Chester, Pennsylvania, and many other origins scattered further west in Chadds Ford and Kennett Square. Clusters of origins branch from Elwyn Station to the north and south along PA 352 and PA 452, and to the west along PA 3 and US 1. Most of the origins are clustered within the boundaries of PA 252 to the east and Interstate 95 to the south.

Figure 19: Elwyn Station



## Media Station

Media Station is located at 305 Media Station Road and S. Orange Street in Upper Providence, Pennsylvania, just over one mile northeast of Elwyn Station. This is a Zone 3 station with a sales office that is open Monday through Friday mornings; the on-board peak one-way fare to Center City is \$6.00.

According to SEPTA, there are a total of 231 daily parking spaces at this station, with an average daily availability of zero spaces, and 18 permit parking spaces. There were 529 daily boards in 2009. A total of 225 license plates were surveyed at Media Station on October 6, 2009. The previous license plate survey at this location took place in 2002.

Table 15 summarizes the top five origins by municipality for Media Station: Middletown, Upper Providence, Concord, Aston, and Media. Together, these top five municipality origins represent 54 percent of the surveyed plates at this station.

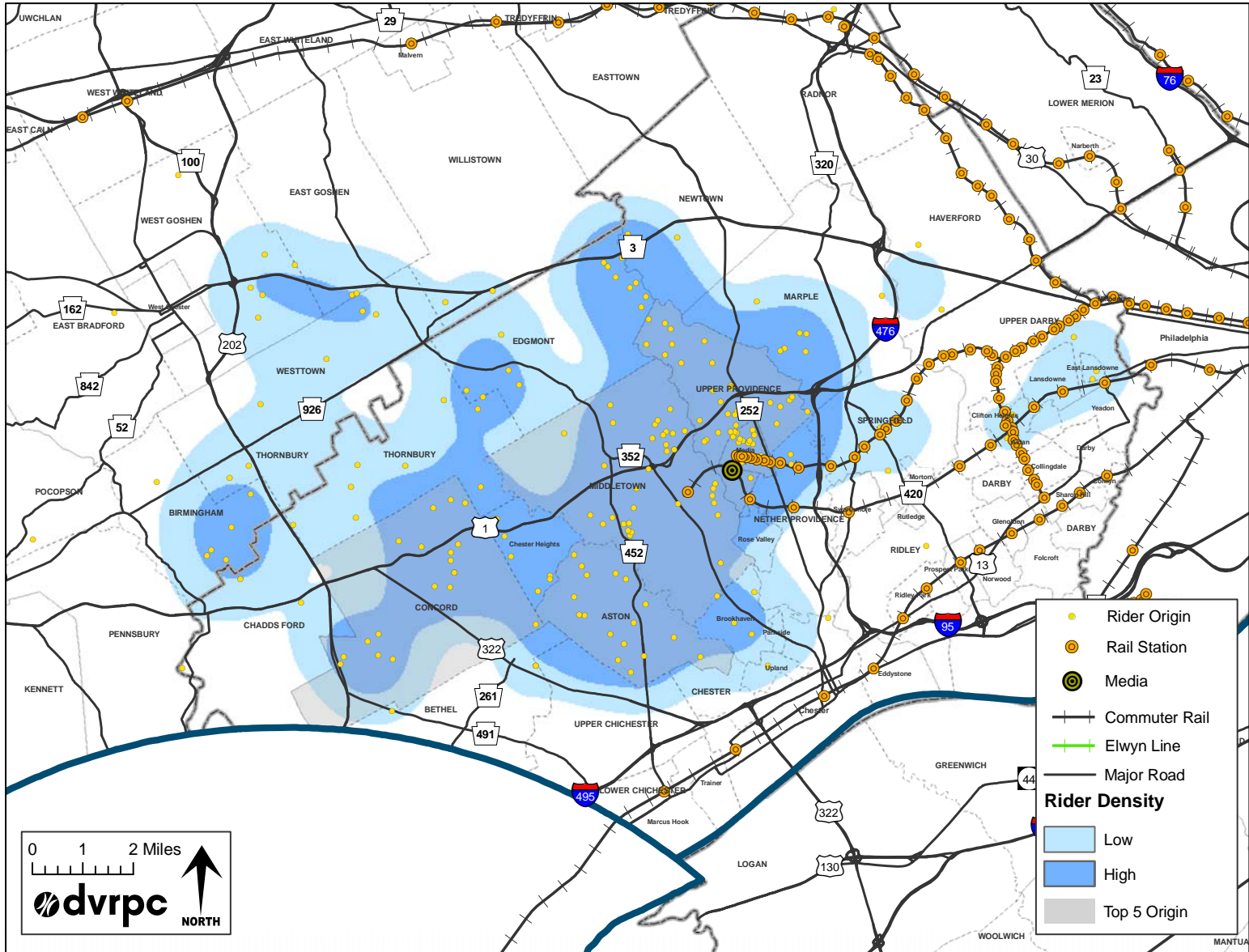
Table 15: Media Top Five Origins

Municipality	Total	Percent
Middletown	36	16%
Upper Providence	36	16%
Concord	19	8%
Aston	17	8%
Media	14	6%
Top Five Total	122	54%
Media Total	225	100%

Source: 2010 DVRPC

Figure 20 illustrates the distribution of origins derived from the license plate surveys. This station has a more compact station shed than Elwyn Station, though clusters of origins extend to the west of the station as far as West Goshen and Birmingham townships. Most of the origins are bounded by PA 3, PA 100, and PA 491, to the north, west, and south, respectively. Very few origins are located east of PA 320, where there are many more Elwyn Line and surface trolley stations.

Figure 20: Media Station



## Morton Station

Morton Station (also called Morton-Rutledge Station) is located at 2 S. Morton Avenue and Yale Avenue in Morton, Pennsylvania, approximately four miles east of Media Station, and approximately 1.5 miles east of Swarthmore Station, the next closest station to the west. This is a Zone 2 station with a sales office that is open Monday through Friday mornings; the on-board peak one-way fare to Center City is \$5.00

According to SEPTA, there are a total of 295 daily parking spaces at this station, with an average daily availability of 31 spaces, and 32 permit parking spaces. There are also 213 municipal parking spaces available. There were 569 daily boards in 2009. A total of 259 license plates were surveyed at Morton Station on October 6, 2009. No previous license plate survey has been conducted at this location.

Table 16 summarizes the top six origins by municipality for Morton Station: Springfield, Ridley, Nether Providence, Marple, Upper Darby, and Swarthmore. Together, these top six municipality origins represent 87 percent of the surveyed plates at this station.

Table 16: Morton Top Six Origins

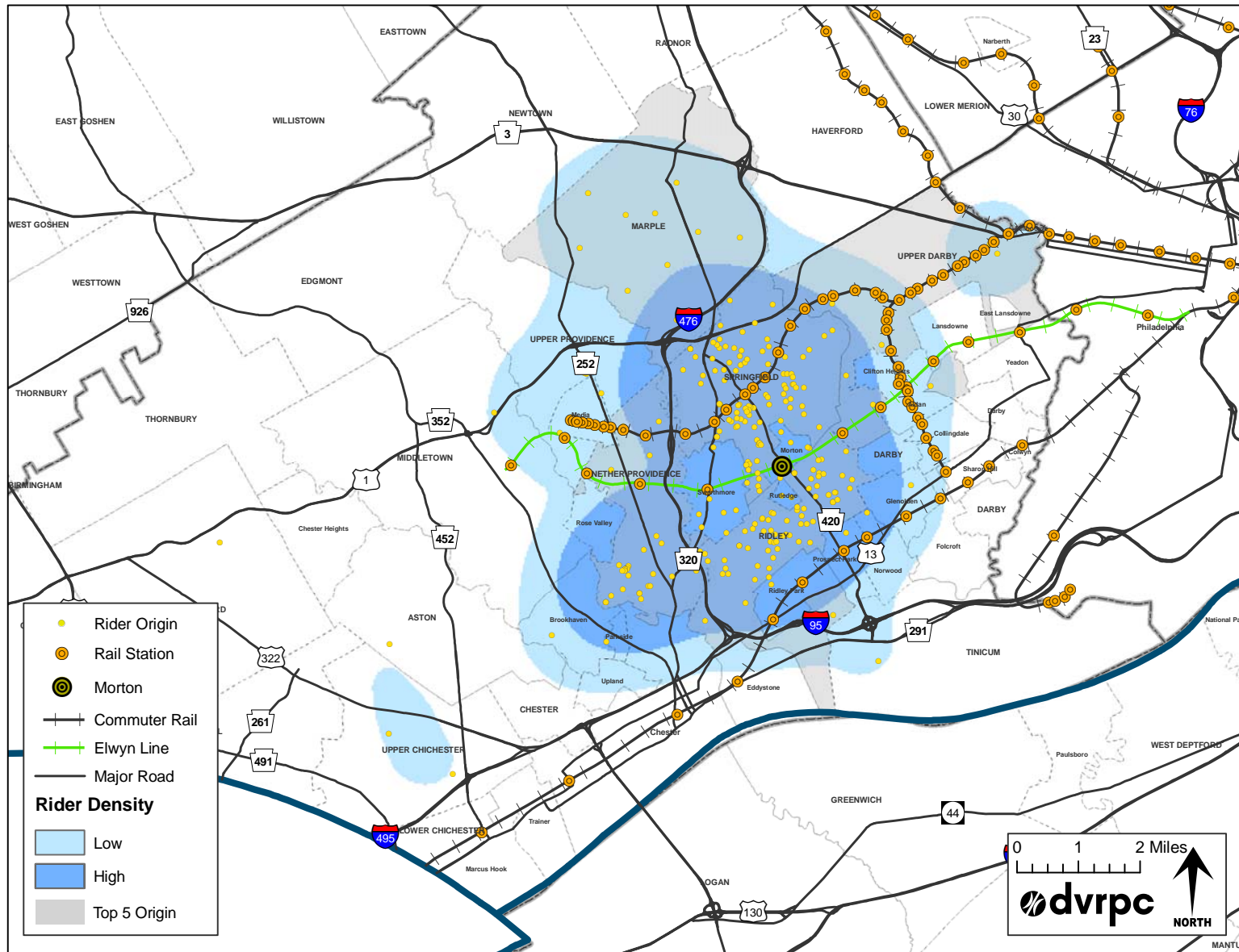
Municipality	Total	Percent
Springfield	100	39%
Ridley	70	27%
Nether Providence	31	12%
Marple	11	4%
Upper Darby	7	3%
Swarthmore	7	3%
Top Six Total	226	87%
Morton Total	259	100%

Source: 2010 DVRPC

Figure 21 illustrates the distribution of origins derived from the license plate surveys. The inner cluster of origins is bounded by US 13 at the south, Interstate 476 at the west, US 1 at the east, and the SEPTA Route 102 Sharon Hill Trolley. Many origins are located in close proximity to the SEPTA Route 101 and 102 trolleys. Very few origins are located south of SEPTA's Marcus Hook line.



Figure 21: Morton Station



## Clifton Station

Clifton Station (also called Clifton-Aldan Station) is located at 699 S. Springfield Road and Maryland Road in Clifton Heights, Pennsylvania, approximately three miles east of Morton Station, and just under one mile east of Primos Station, the next closest station to the west. This is a Zone 2 station with a sales office that is open Monday through Friday mornings; the on-board peak one-way fare to Center City is \$5.00

According to SEPTA, there are a total of 110 daily parking spaces at this station, with an average daily availability of zero spaces, and 32 permit parking spaces. There were 339 daily boards in 2009. A total of 130 license plates were surveyed at Morton Station on October 6, 2009. No previous license plate survey has been conducted at this location.

Table 17 summarizes the top five origins by municipality for Clifton Station: Springfield, Upper Darby, Collingdale, Aldan, and Clifton Heights. Together, these top five municipality origins represent 84 percent of the surveyed plates at this station.

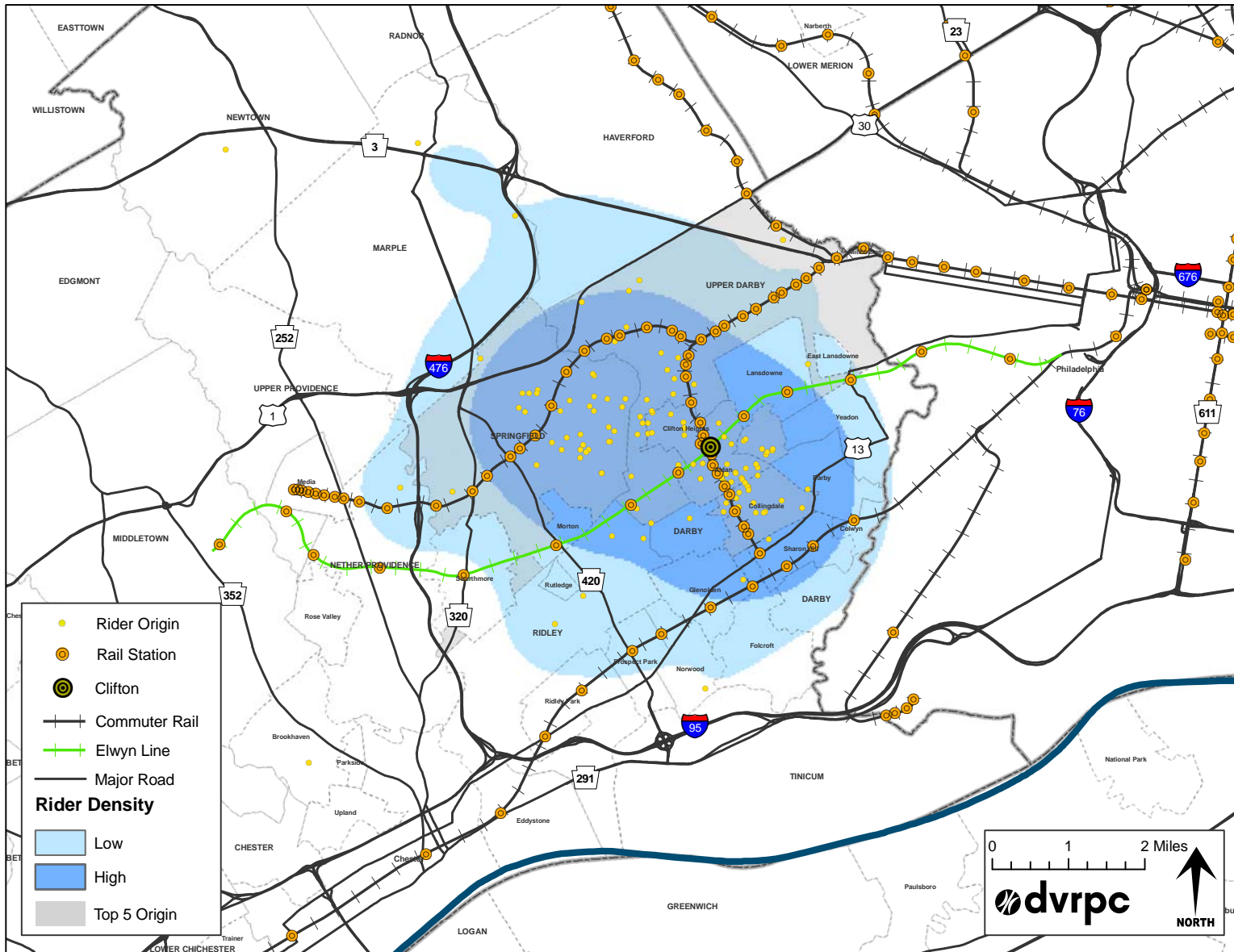
Table 17: Clifton Top Five Origins

Municipality	Total	Percent
Springfield	34	26%
Upper Darby	28	22%
Collingdale	20	15%
Aldan	17	13%
Clifton Heights	10	8%
Top Five Total	109	84%
Clifton Total	130	100%

Source: 2010 DVRPC

Figure 22 illustrates the distribution of origins derived from the license plate surveys. Most of the origins fall within one distinct cluster bounded by US 13 at the south, PA 420 at the west, and US Highway 1 at the north. Several origins are located in close proximity to the SEPTA surface trolley stations and very few are located south of US 13, which is approximately parallel to the local section of SEPTA's Marcus Hook Line.

Figure 22: Clifton Station





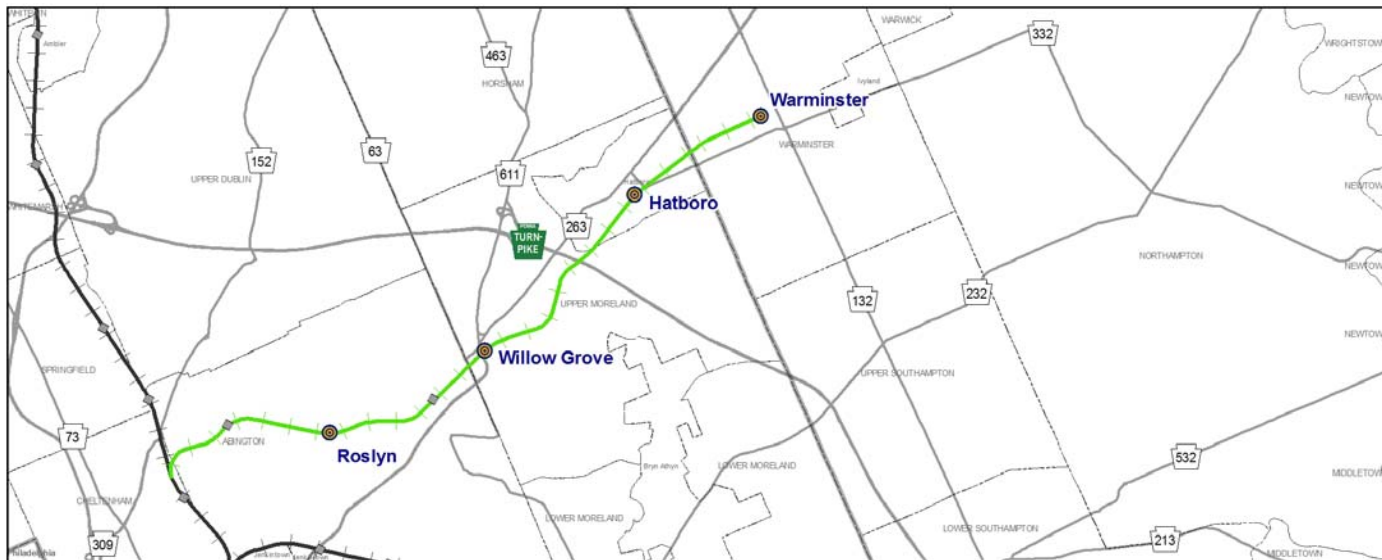
# Warminster Regional Rail Line

## Warminster Line Description

The SEPTA Warminster Regional Rail Line runs northwest between Central Philadelphia and Warminster, Pennsylvania. This line runs through North Philadelphia and connects to several stations in Montgomery County before Warminster in Bucks County.

The following Warminster Line stations were surveyed: Warminster, Hatboro, Willow Grove, and Roslyn. Figure 23 displays the stations surveyed along the Warminster regional rail line.

Figure 23: Warminster Line Stations Surveyed



## Warminster Station

Warminster Station is located at 516 Jacksonville Road and Street Road in Warminster, Pennsylvania, at the northern terminus of the Warminster Regional Rail Line. This is a Zone 4 station with a sales office that is open Monday through Friday mornings; the on-board peak one-way fare to Center City is \$7.00.

According to SEPTA, there are a total of 800 parking spaces at this station, with an average daily availability of zero spaces. There were 1,031 daily boards in 2009. A total of 693 license plates were surveyed at Warminster Station on October 16, 2009. The previous license plate survey at this location took place in 2002.

Table 18 summarizes the top five origins by municipality for Warminster Station: Warminster, Warrington, Northampton, Warwick, and Buckingham. Together, these top five municipality origins represent 74 percent of the surveyed plates at this station.

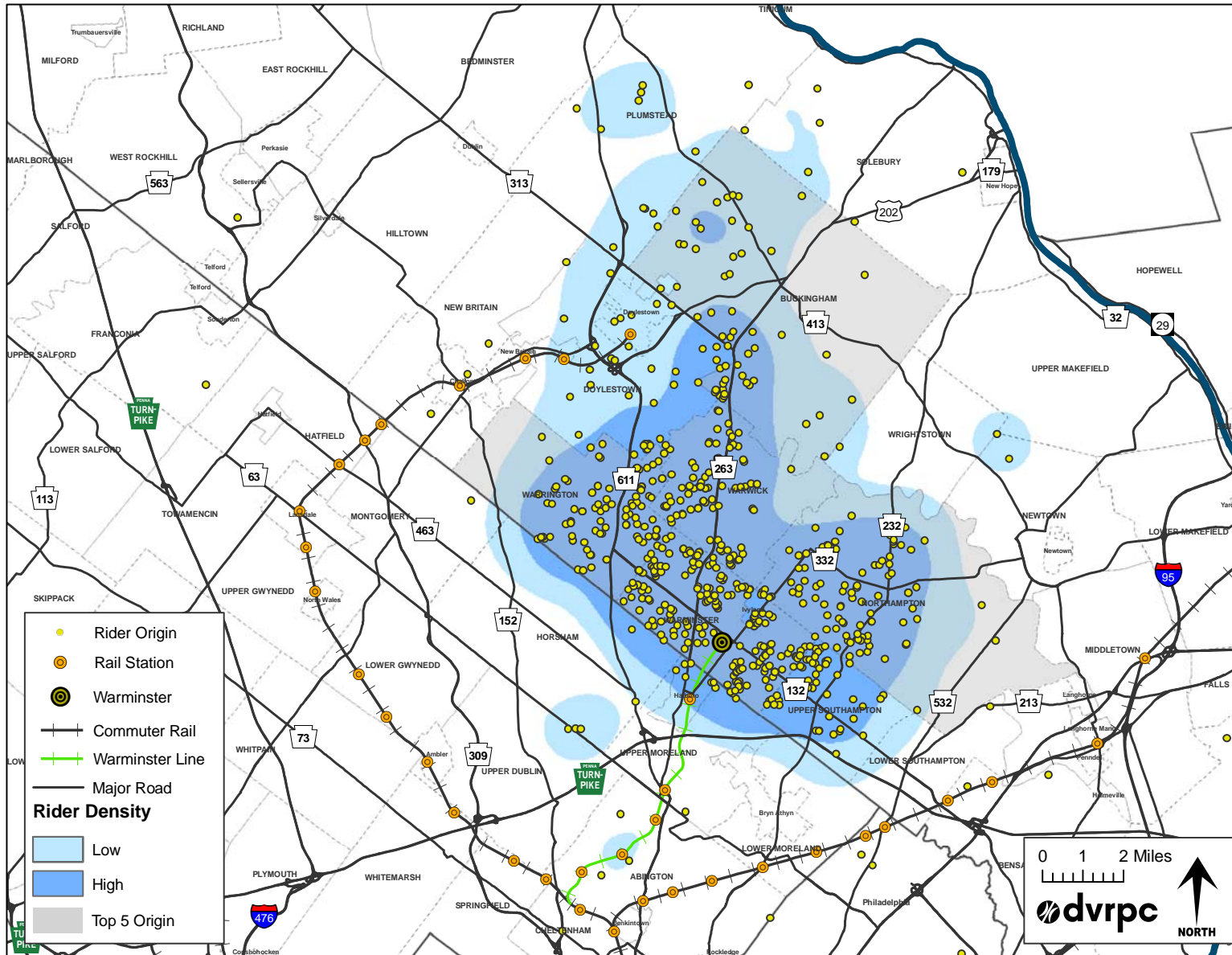
Table 18: Warminster Top Five Origins

Municipality	Total	Percent
Warminster	171	25%
Warrington	104	15%
Northampton	94	14%
Warwick	91	13%
Buckingham	56	8%
Top Five Total	516	74%
Warminster Total	693	100%

Source: 2010 DVRPC

Figure 24 illustrates the distribution of origins derived from the license plate surveys. Most of the origins are clustered to the north of Warminster Station, following the corridors of PA 611, PA 263, PA 332, and PA 232. Several origins are clustered as far north as Pipersville, though most are located within the bounds of the PA Turnpike at the south, PA 152 at the west, US 202 at the north, and PA 413 at the east.

Figure 24: Warminster Station



## Hatboro Station

Hatboro Station is located at 85 S. Penn Street and Byberry Avenue in Hatboro, Pennsylvania, just under two miles south of Warminster Station. This is a Zone 4 station with a sales office that is open Monday through Friday mornings; the on-board peak one-way fare to Center City is \$7.00.

According to SEPTA, there are a total of 100 parking spaces at this station, with an average daily availability of zero spaces. There are 77 metered parking spots available as well. There were 473 daily boards in 2009. A total of 176 license plates were surveyed at Hatboro Station on October 16, 2009. The previous license plate survey at this location took place in 2004.

Table 19 summarizes the top five origins by municipality for Hatboro Station: Upper Moreland, Horsham, Hatboro, Warrington, and Warminster. Together, these top five municipality origins represent 85 percent of the surveyed plates at this station.

Table 19: Hatboro Top Five Origins

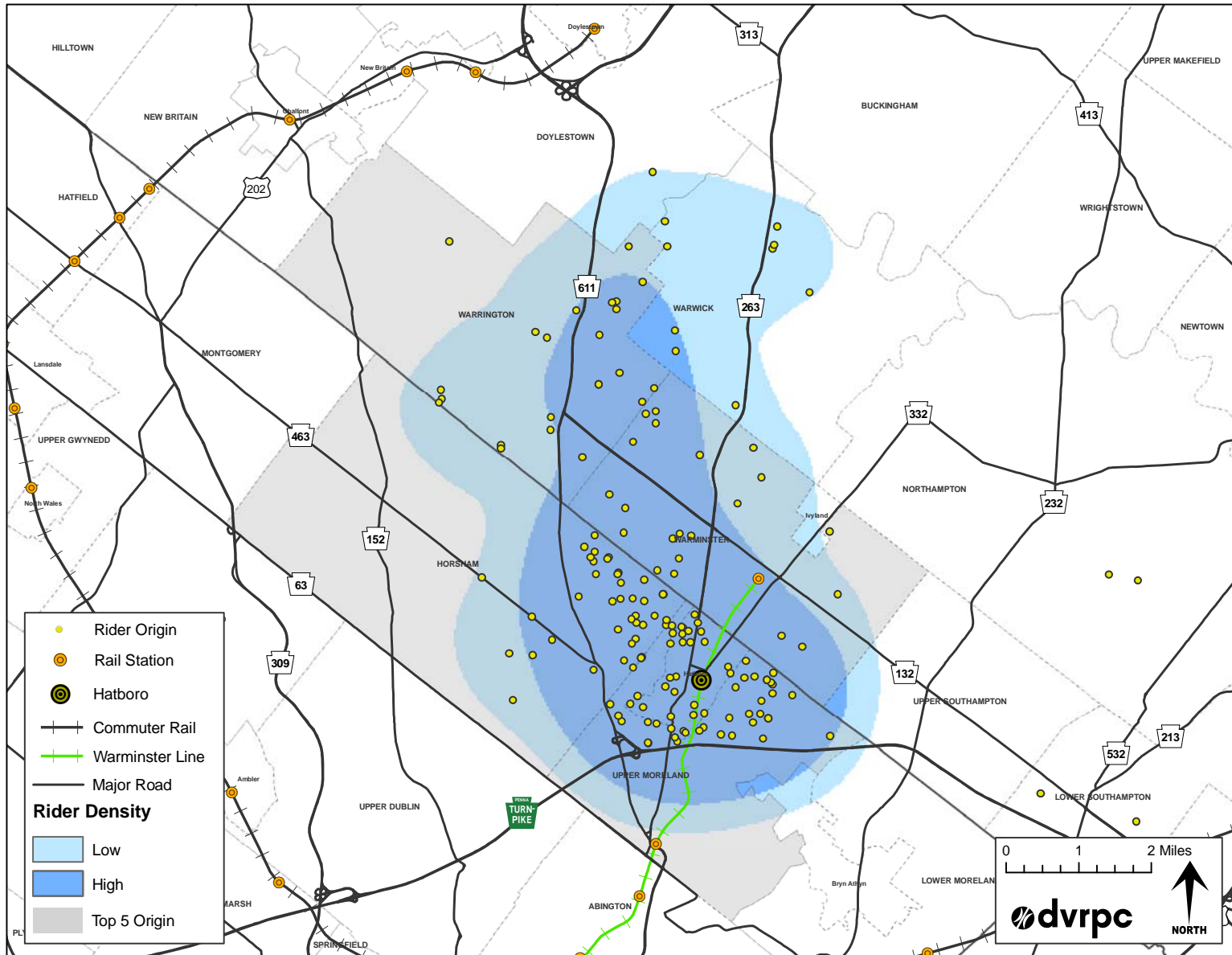
Municipality	Total	Percent
Upper Moreland	43	24%
Horsham	38	22%
Hatboro	25	14%
Warrington	23	13%
Warminster	21	12%
Top Five Total	150	85%
Hatboro Total	176	100%

Source: 2010 DVRPC

Figure 25 illustrates the distribution of origins derived from the license plate surveys. Most of the origins are clustered within the corridor between PA 611 and PA 263. Many are also clustered immediately east of Hatboro Station. There are very few outliers beyond the main cluster of origins.



Figure 25: Hatboro Station



## Willow Grove Station

Willow Grove Station is located at 202 Davisville Road and Old York Road (Route 611) in Upper Moreland Pennsylvania, just under three miles south of Hatboro Station. This is a Zone 3 station with a sales office that is open Monday through Friday mornings; the on-board peak one-way fare to Center City is \$6.00.

According to SEPTA, there are a total of 100 parking spaces at this station, with an average daily availability of zero spaces, and 31 permit parking spaces. There were 491 daily boards in 2009. A total of 117 license plates were surveyed at Willow Grove Station on October 16, 2009. No previous license plate survey has been conducted at this location.

Table 20 summarizes the top five origins by municipality for Willow Grove Station: Upper Moreland, Horsham, Abington, Upper Dublin, and Warrington. Together, these top five municipality origins represent 87 percent of the surveyed plates at this station.

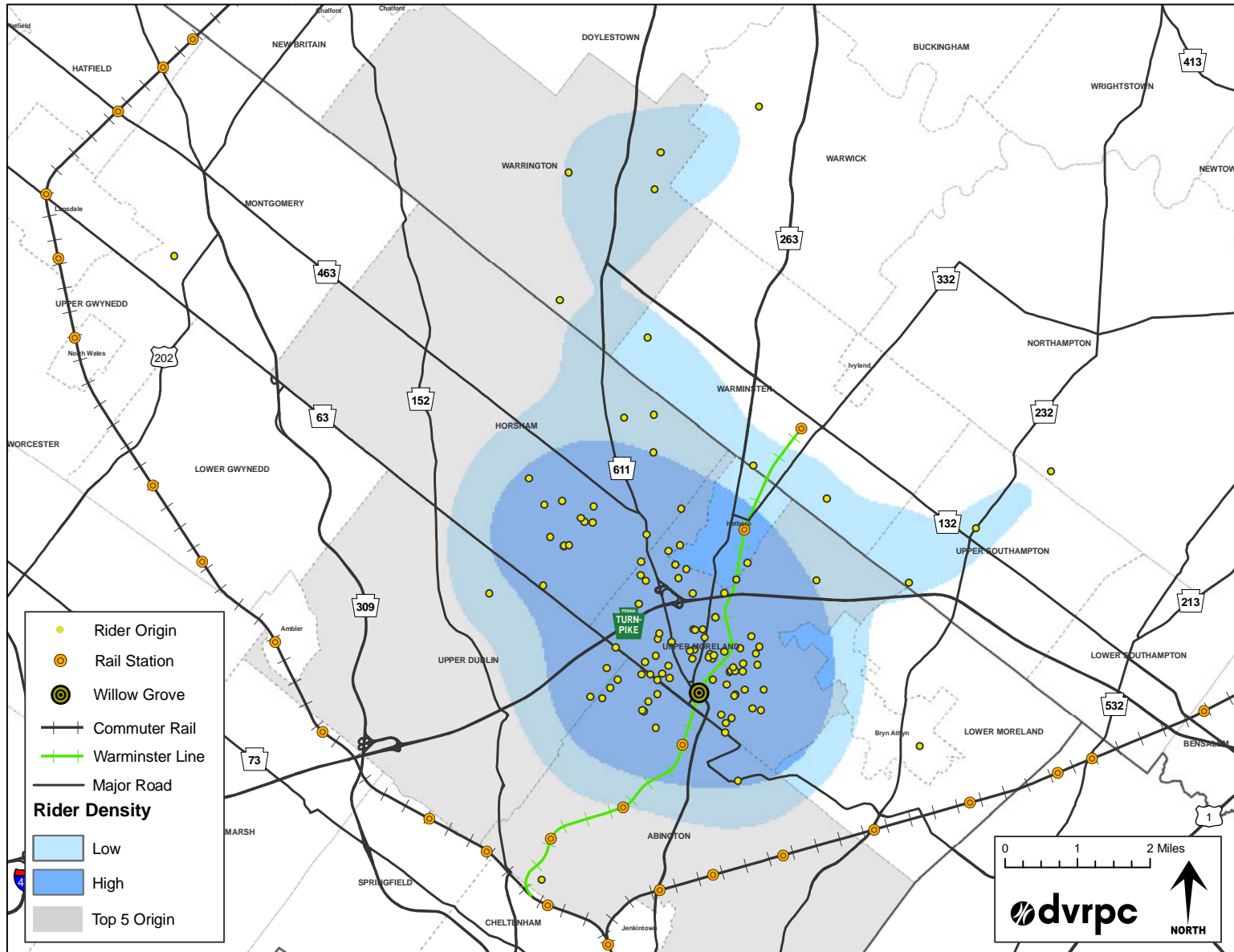
Table 20: Willow Grove Top Five Origins

Municipality	Total	Percent
Upper Moreland	65	56%
Horsham	18	15%
Abington	11	9%
Upper Dublin	4	3%
Warrington	4	3%
Top Five Total	102	87%
Willow Grove Total	117	100%

Source: 2010 DVRPC

Figure 26 illustrates the distribution of origins derived from the license plate surveys. Most of the origins are clustered very close to Willow Grove Station, with many located between PA 63 and the PA Turnpike. As noted in Table 20, several origins are located as far north as Warrington, and a few are located as far east as Southampton. However, most fall within the bounds of PA 152 at the west, PA 463 and PA 132 at the north, and PA 232 at the east. None are located as far south as the West Trenton Regional Rail Line.

Figure 26: Willow Grove Station



## Roslyn Station

Roslyn Station is located 1096 S. Easton Road and Susquehanna Road in Abington Pennsylvania, approximately two miles south of Willow Grove Station. This is a Zone 3 station with a sales office that is open Monday through Friday mornings; the on-board peak one-way fare to Center City is \$6.00.

According to SEPTA, there are a total of 87 parking spaces at this station, with an average daily availability of zero spaces. There were 237 daily boards in 2009. A total of 66 license plates were surveyed at Roslyn Station on October 16, 2009. No previous license plate survey has been conducted at this location.

Table 21 summarizes the top three origins by municipality for Willow Grove Station: Abington, Upper Dublin, and Upper Moreland. Together, these top three municipality origins represent 89 percent of the surveyed plates at this station. One origin is located in each of the seven other municipalities that are part of the Roslyn Station shed.

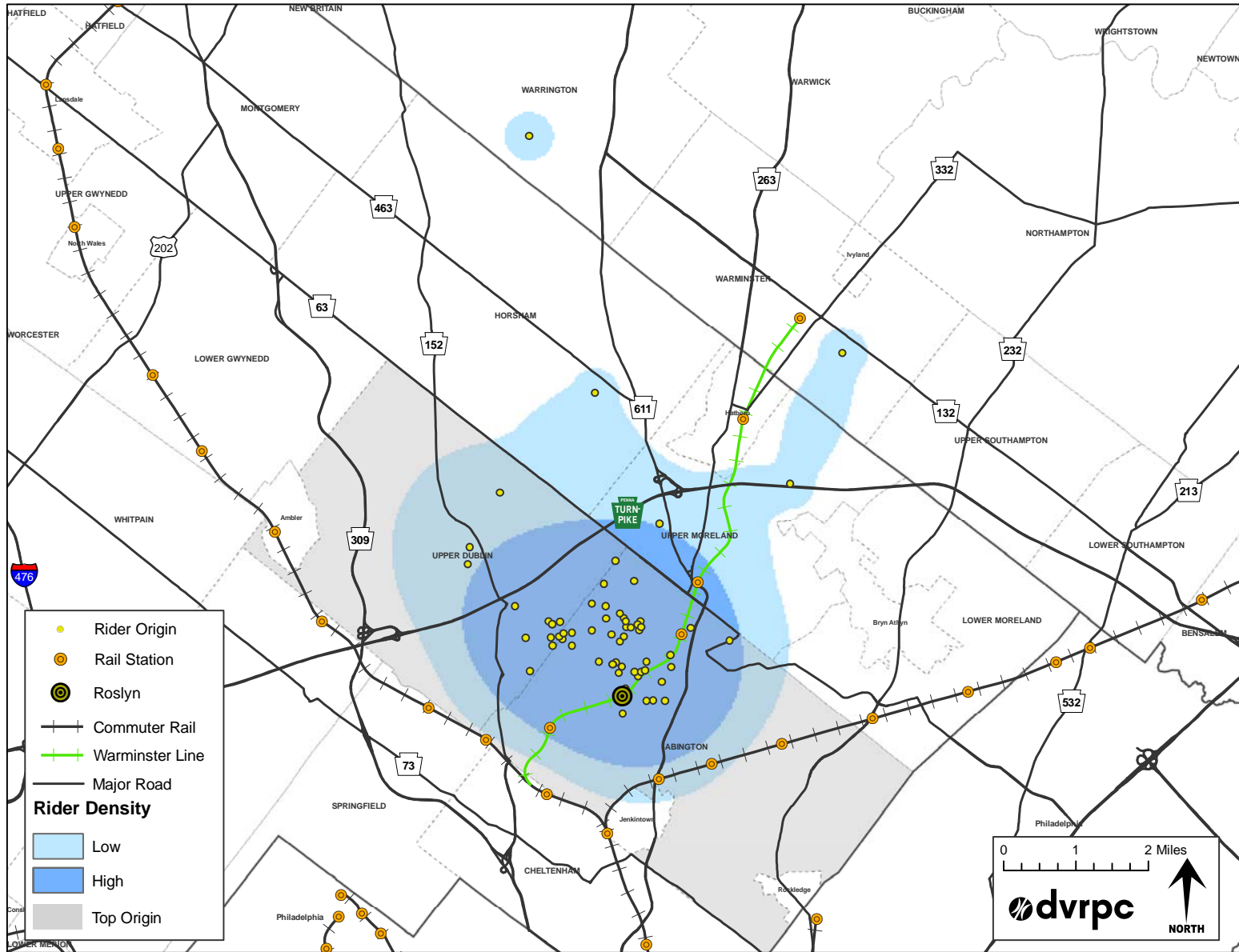
Table 21: Roslyn Top Three Origins

Municipality	Total	Percent
Abington	45	68%
Upper Dublin	12	18%
Upper Moreland	2	3%
Top Three Total	59	89%
Roslyn Total	66	100%

Source: 2010 DVRPC

Figure 27 illustrates the distribution of origins derived from the license plate surveys. Most origins fall within a small cluster very close to Roslyn Station. Nearly all origins are located within the bounds of the Doylestown/Lansdale Regional Rail Line at the south, PA 152 at the west, the PA Turnpike at the north, and PA 611 at the east.

Figure 27: Roslyn Station





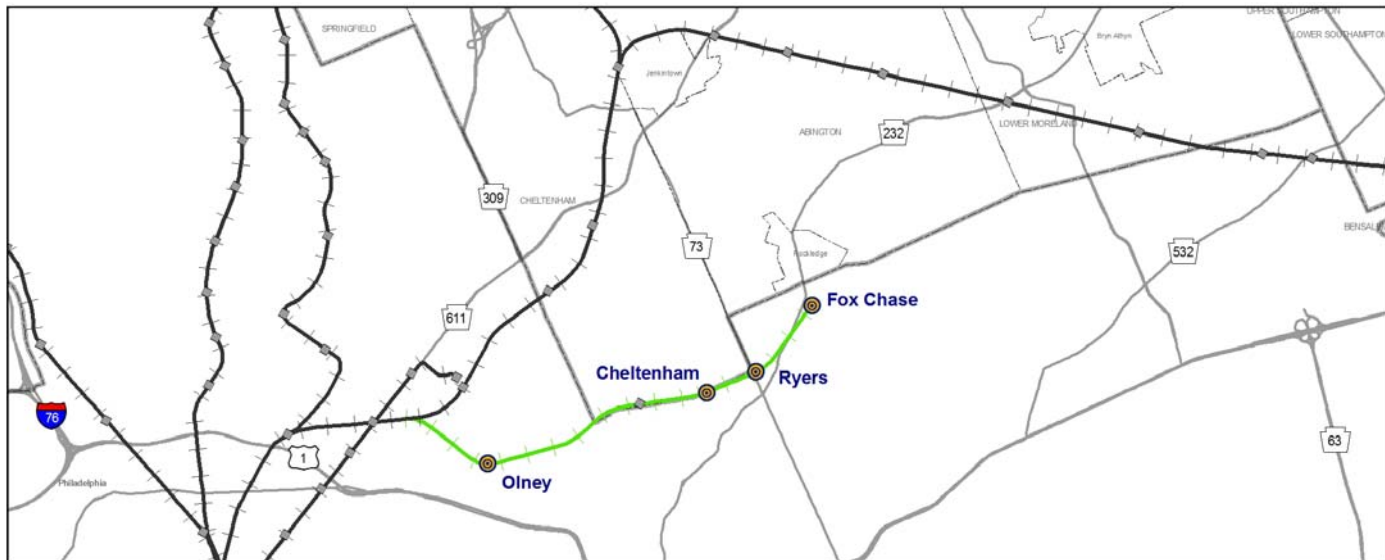
# Fox Chase Regional Rail Line

## Fox Chase Line Description

The SEPTA Fox Chase Regional Rail Line runs north between Central Philadelphia and Northeast Philadelphia. This line runs through North Philadelphia and connects to several stations in Philadelphia close to the Montgomery County border.

The following Fox Chase Line stations were surveyed: Fox Chase, Ryers, Cheltenham, and Olney. These maps use a smaller scale due to the smaller number of origins captured. Figure 28 displays the stations surveyed along the Fox Chase regional rail line.

Figure 28: Fox Chase Line Stations Surveyed



## Fox Chase Station

Fox Chase Station is located at 434 Rhawn Street and Elberon Avenue in Philadelphia, Pennsylvania, at the terminus of the Fox Chase Regional Rail Line. This is a Zone 2 Station with a sales office that is open Monday through Friday mornings; the on-board peak one-way fare to Center City is \$5.00.

According to SEPTA, there are a total of 342 daily parking spaces at this station, with an average daily availability of zero spaces. There were 1,260 daily boards in 2009. A total of 362 license plates were surveyed at Fox Chase Station on April 15, 2010. The previous license plate survey at this location took place in 2002. There is also parking along Rockwell Avenue.

Table 22 summarizes the top six origins by municipality for Fox Chase Station: Philadelphia, Abington, Rockledge, Cheltenham, Bensalem, and Lower Moreland. Together, these top six municipality origins represent 97 percent of the surveyed plates at this station. The great majority of origins are located in Philadelphia, home to 81 percent of the surveyed plates at Fox Chase Station.

Table 22: Fox Chase Top Six Origins

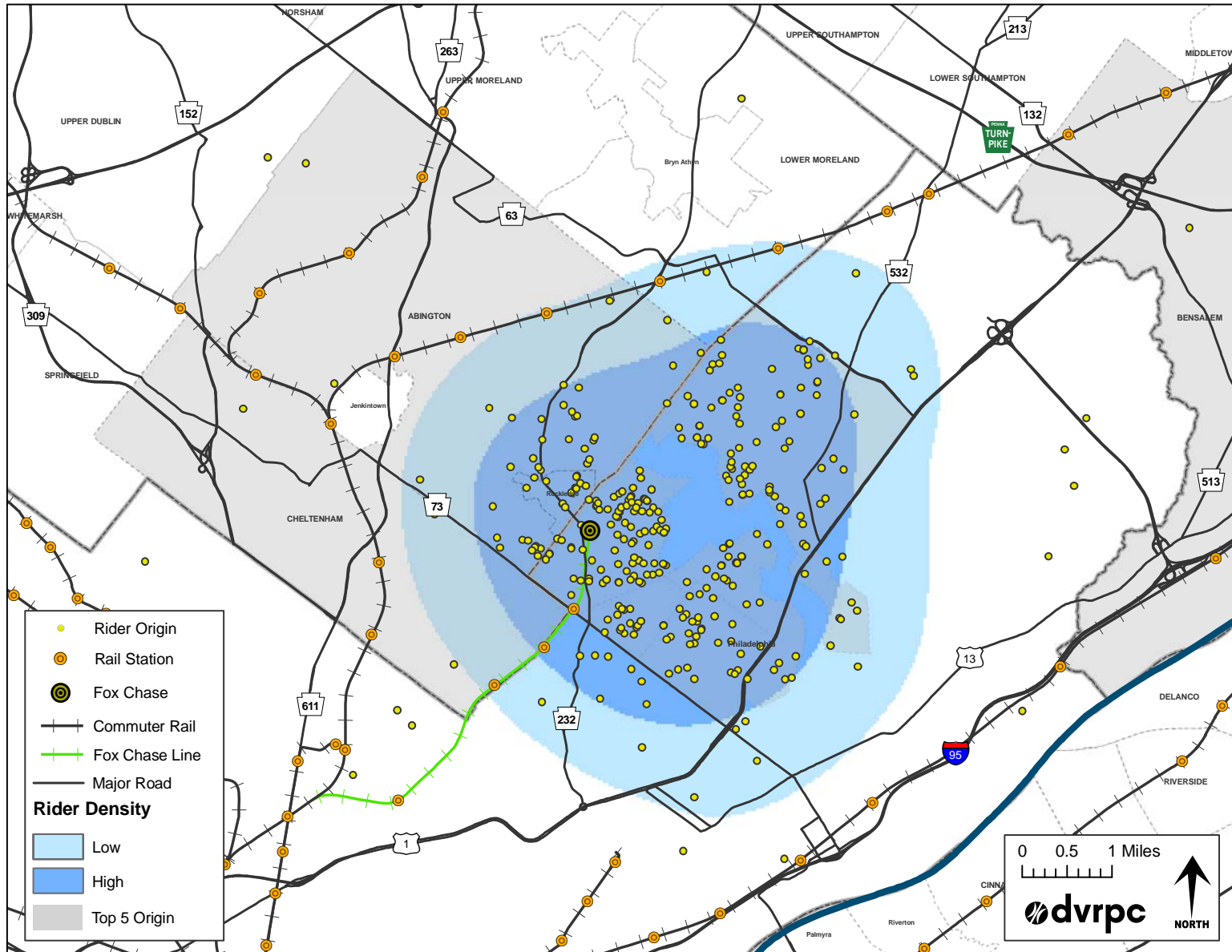
Municipality	Total	Percent
Philadelphia	293	81%
Abington	40	11%
Rockledge	12	3%
Cheltenham	3	1%
Bensalem	2	1%
Lower Moreland	2	1%
Top Six Total	352	97%
Fox Chase Total	362	100%

Source: 2010 DVRPC

Figure 29 illustrates the distribution of origins derived from the license plate surveys. Most origins are located north and east of PA 73, and north and west of US 1. Very few origins are located south of US 13 or north of PA 63. A few origins are located near the West Trenton Regional Rail Line, but most are closer to Fox Chase Station.



Figure 29: Fox Chase Station



## Ryers Station

Ryers Station is located at 749 Cottman Avenue and Hasbrook Avenue in Philadelphia, Pennsylvania, one mile south of Fox Chase Station. This is a Zone 2 Station with no ticket sales office; the on-board peak one-way fare to Center City is \$5.00.

According to SEPTA, there are a total of 71 daily parking spaces at this station, with an average daily availability of nine spaces. There were 347 daily boards in 2009. A total of 55 license plates were surveyed at Ryers Station on April 15, 2010. The previous license plate survey at this location took place in 2005.

Table 23 summarizes the four origins by municipality for Ryers Station: Philadelphia, Cheltenham, Abington, and Upper Gwynedd. Together, these four municipality origins represent all of the surveyed plates at this station. The great majority of origins are located in Philadelphia, home to 87 percent of the surveyed plates at Ryers Station.

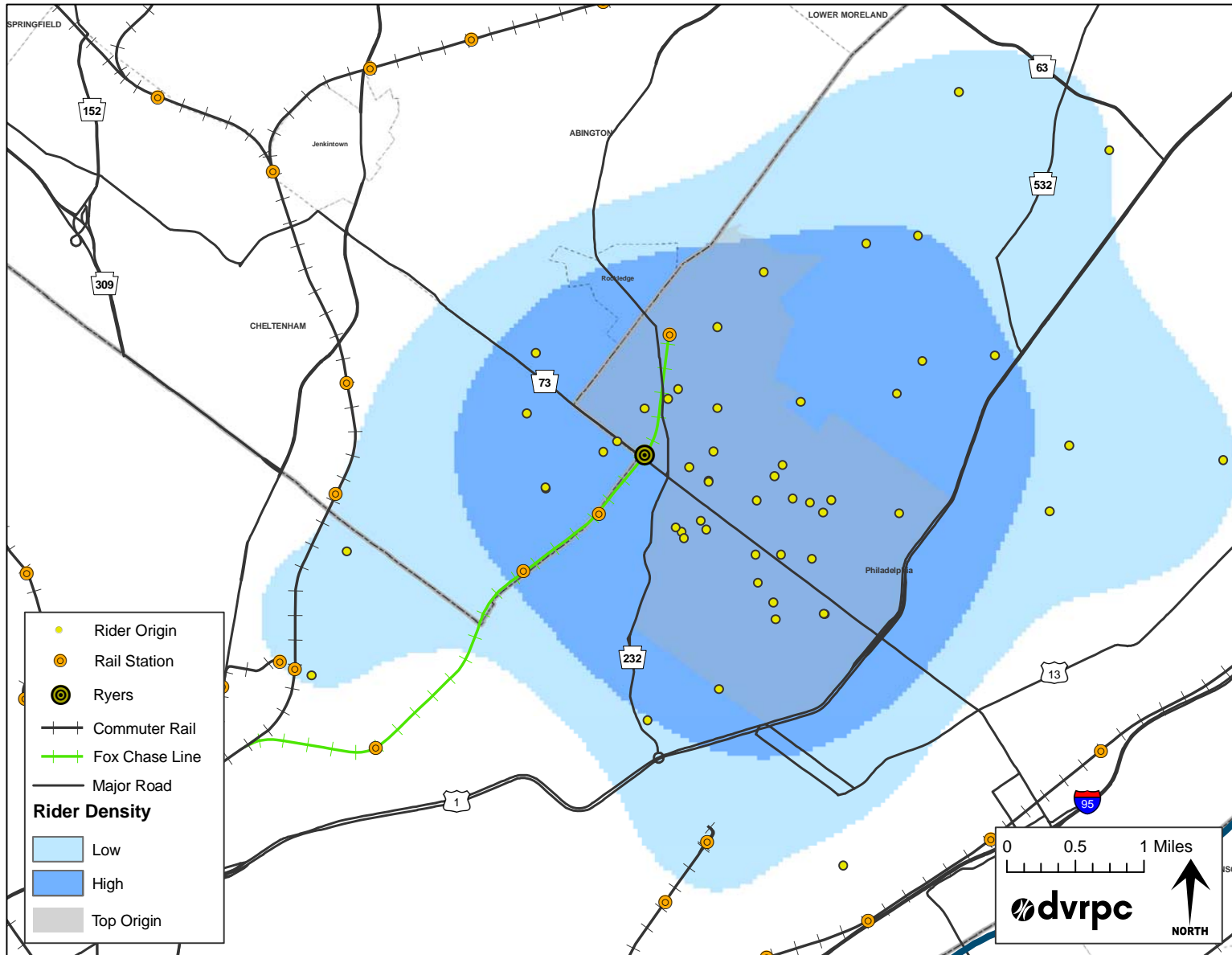
Table 23: Ryers Top Four Origins

Municipality	Total	Percent
Philadelphia	48	87%
Cheltenham	5	9%
Abington	1	2%
Upper Gwynedd	1	2%
Top Four Total	55	100%
Ryers Total	55	100%

Source: 2010 DVRPC

Figure 30 illustrates the distribution of origins derived from the license plate surveys. Most origins are located close to Ryers Station, or to the southeast of the station within the corridor bounded by US 1 and PA 232.

Figure 30: Ryers Station



## Cheltenham Station

Cheltenham Station is located at 589 Hasbrook Avenue and Martins Mill Road in Philadelphia, Pennsylvania, just over a half mile south of Ryers Station. This is a Zone 2 Station with a sales office open Monday through Friday mornings; the on-board peak one-way fare to Center City is \$5.00.

According to SEPTA, there are a total of 25 daily parking spaces at this station, with an average daily availability of zero spaces. There were 284 daily boards in 2009. A total of 46 license plates were surveyed at Cheltenham Station on April 15, 2010. No previous license plate survey has been conducted at this location. There is additional parking along Hasbrook Avenue.

Table 24 summarizes the top four origins by municipality for Cheltenham Station: Philadelphia, Cheltenham, Upper Southampton, and Upper Dublin. Together, these four municipality origins represent 93 percent of the surveyed plates at this station. One origin is located in each of the three other municipalities that are part of the Cheltenham Station shed.

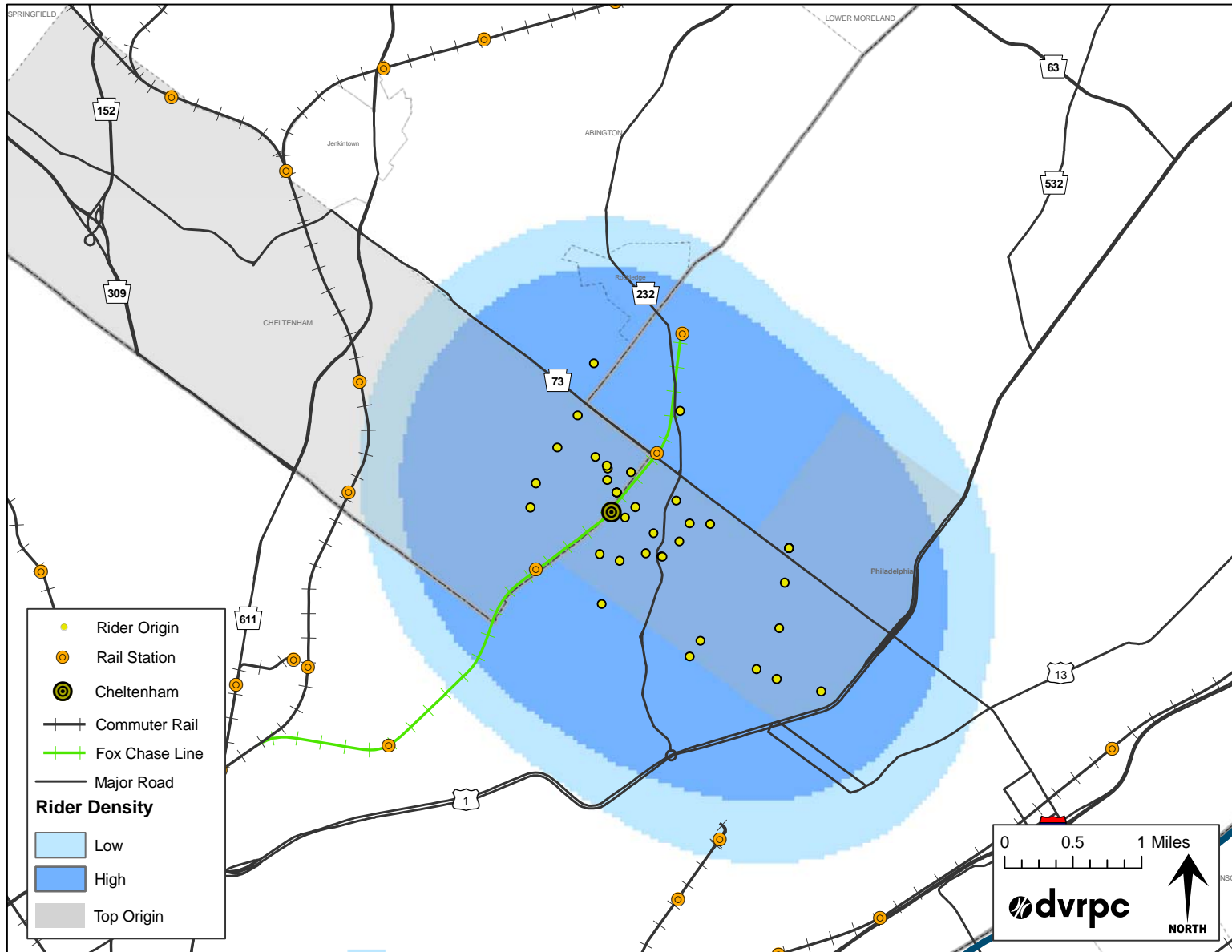
Table 24: Cheltenham Top Four Origins

Municipality	Total	Percent
Philadelphia	26	57%
Cheltenham	13	28%
Upper Southampton	2	4%
Upper Dublin	2	4%
Top Four Total	43	93%
Cheltenham Total	46	100%

Source: 2010 DVRPC

Figure 31 illustrates the distribution of origins derived from the license plate surveys. All Cheltenham origins are clustered close to Cheltenham Station. A few are located closer to other Fox Chase Line stations to the north (Fox Chase and Ryers); however, none are located beyond US 1 to the south.

Figure 31: Cheltenham Station



## Olney Station

Olney Station is located at 5411 N. Mascher Street and Tabor Road in Philadelphia, Pennsylvania, just over 2.5 miles south of Cheltenham Station. Lawndale Station is the next closest station to the north, which is approximately two miles north of Olney Station. This is a Zone 1 Station with no ticket sales office; the on-board peak one-way fare to Center City is \$4.00.

According to SEPTA, there are a total of 61 daily parking spaces at this station, with an average daily availability of zero spaces. There were 148 daily boards in 2009. A total of 14 license plates were surveyed at Olney Station on April 15, 2010. No previous license plate survey has been conducted at this location.

Table 25 summarizes the three origins by municipality for Olney Station: Philadelphia, Cheltenham, and Lower Pottsgrove. Together, these three municipality origins represent all of the surveyed plates at this station.

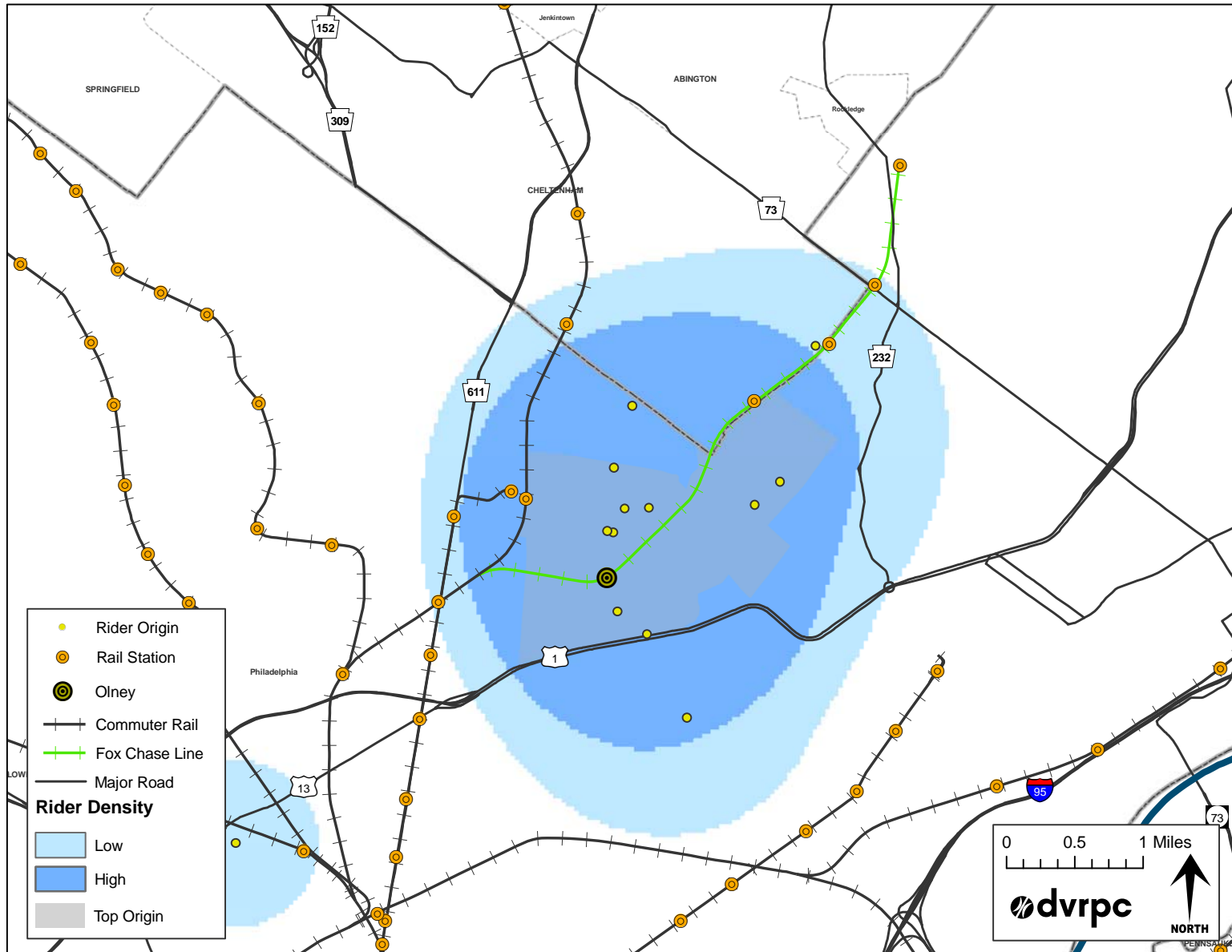
Table 25: Olney Top Three Origins

Municipality	Total	Percent
Philadelphia	12	86%
Cheltenham	1	7%
Lower Pottsgrove	1	7%
Top Four Total	14	100%
Olney Total	14	100%

Source: 2010 DVRPC

Figure 32 illustrates the distribution of origins derived from the license plate surveys. Almost all of Olney Station origins are located in Philadelphia, with only two outside of the city borders. The Cheltenham origin is just outside of Philadelphia; the Lower Pottsgrove origin is an extreme outlier and is not shown on this map.

Figure 32: Olney Station







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**Key Words:** SEPTA, Regional Rail, Station Shed, West Trenton, Elwyn, Warminster, Fox Chase

**Abstract:** An analysis of the rider origins on the West Trenton, Elwyn, Warminster, and Fox Chase regional rail lines to determine the geographic areas from which riders originate. Rider origins are obtained from license plates, address matched by PennDOT, and mapped. The density of origins relative to each other is calculated and displayed for each station in the study.

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